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Abstract

This guide sets forth requirements common to all good school construction which must be met and recommends additional procedures which can lead to a still better facility. It covers the construction of new buildings, of additions to or remodeling of existing structures, and the acquisition of buildings occupied or to be occupied by pupils. Information is presented under the following headings--(1) planning a successful school building program, (2) desirable features, (3) selecting a site, (4) modernization of existing schools, (5) plan preparation, filing, and approval, (6) design-space requirements, (7) ventilation, (8) heating, (9) air conditioning, (10) sanitation, (11) school plant safety, and (12) lighting. (FS)

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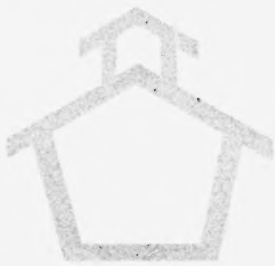
GUIDE
for
SCHOOLHOUSE PLANNING
and
CONSTRUCTION

1969



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FOREWORD

School buildings are obviously important elements in any educational program. They must be well planned to contribute positively to a better education for all students. They represent a sizeable investment by local school districts and their planning and later construction and maintenance is a prime concern of administrators and school boards. Mistakes made in the planning of school buildings are not easily nor cheaply corrected.

Most importantly, school buildings provide the setting and atmosphere for the education of students. It is clear that a dull, unimaginative and poorly planned setting does not help improve education and may even detract from teaching and learning. It is also clear that a stimulating physical environment can lend excitement to education. It would be my hope that board members, school administrators and the lay public would marshall all the resources and imagination at their disposal to construct highly useable and adaptable school buildings.

The purpose of this *Guide* is to set forth those requirements, common to all good school construction which must be met and to recommend additional procedures which can lead to a still better facility. The State Board of Education establishes *minimum* requirements to insure that the health and safety of students is not endangered in any school building. The responsibility for providing minimally acceptable school facilities rests with each local board of education.

However, it is emphasized that the requirements of this Guide are indeed minimal and may be appropriately exceeded to implement forward-looking local planning.

This revision in the *Guide for Schoolhouse Planning and Construction* represents many hours of effort and thought by the Advisory Committee. This committee, which consists of architects and school administrators and school board members, has spent many hours going over the experiences of New Jersey school districts as they used previous *Guides*. The contribution made by the members of this committee cannot be overstated, and they deserve the appreciation of all of us involved in New Jersey education.

Sadly, Dr. Cleve O. Westby, who served as the Secretary of the Advisory Committee and who, for fifteen years, served as the Director of the Bureau of Construction, passed away in July of last year. During his tenure in the Department, Dr. Westby directed the construction of over one billion dollars worth of schools and provided personal assistance to many New Jersey school districts. His spirit, intelligence and expertise will be sorely missed by us all.

The primary responsibility of the board of education in conjunction with the professional staff is to develop specifications on the education program to be offered in the new facility. In fact, the construction of a new building may be a useful occasion on which to evaluate the existing educational program and to chart new directions. Careful attention should be paid to the translation of these educational specifications into a physical plan by the architect. This *Guide for Schoolhouse Planning and Construction* should be carefully studied by any board of education before it begins its planning for any new educational facility. If assistance is desired, there are many consultative services available from the Department of Education. These services range from devising an updated educational program to technical aspects of the construction of a new facility.

This newest edition of the *Guide for Schoolhouse Planning and Construction* has been adopted by the State Board of Education and its provisions are effective immediately. I hope that those who use the *Guide* will subject it to most careful scrutiny for its usefulness and helpfulness to local school boards and architects. Recommendations, changes, deletions, additions and improvements are seriously solicited.

Carl L. Marburger
Commissioner of Education

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A Recommended TIMETABLE for PLANNING SCHOOL CONSTRUCTION

(also see 100 thru 138)

1—Basic analysis of capital needs including: (a) evaluation of existing plant facilities (b) pupil enrollment projection (c) determination of program and methodology (d) analysis of financial status	3 months
2—Development of detailed, written educational specifications	3 months
3—An architect is selected	1 month
4—A school site is selected with the assistance of the architect and specialists	2 months
5—Schematic plans are developed by the architect in accordance with the educational specifications	3 months
6—A complete schematic submission is made to the Bureau of School Planning Services for review, consultation, discussion and approval If extension of credit is needed, an additional 60 days should be allowed	1 month
7—Dissemination of information, at the local level, through a planned public information program. Referendum follows, if needed	3 months
8—Following local authorization of funds, preliminary plans are prepared and submitted to the Bureau	1 month
9—For Bureau reviews and consultation, including both educational and *GUIDE* requirements	1 month
10—After preliminary approval, architect develops final plans and specifications	6 months
11—Bureau submission is made. For final review, consultation, modification and correction	1 month
12—Advertising for and accepting bids and awarding contracts	1 month
13—For construction, site development, equipping and furnishing	16 months
Total time from recognition of need to occupancy of building	42 months

The times mentioned are estimates made on the basis of experience. They are subject to numerous variables such as: the scope of the program, the number and the experience of the persons responsible for the various steps, the season of the year when bids are taken, and the available labor and material supply.

1. GENERAL INFORMATION

1.1 ON BEING INFORMED

Boards of Education, their administrators and their architects contemplating the construction, remodeling, enlarging, or acquisition of a building to be used for school purposes, should familiarize themselves with all statutes and regulations concerned with the submission of plans and specifications to the Department of Education for review and approval.

1.2 AUTHORITY

The State Board of Education is authorized under 18A:4-15, *New Jersey Statutes Annotated,* to prescribe rules and regulations necessary to carry into effect the school laws of this State, and under 18A:33-1 and 18A:20-36, *New Jersey Statutes Annotated,* to review and approve plans, inspect buildings, order alteration or abandonment of buildings, and under 18A:18-8 through 18A:18-17 to classify contractors. The authority for the regulations and standards set forth in this *Guide* are derived from the aforementioned Statutes.

1.3 SCOPE

This *Guide for Schoolhouse Planning and Construction* relates to all public school buildings occupied by pupils in the state.

It covers the construction of new buildings, of additions or remodeling of existing buildings, and the acquisition of buildings occupied or to be occupied by pupils. The approval of plans and specifications is limited to the specific regulations enumerated in the *Guide* and does not contemplate the endorsement of the materials, mechanical equipment, or other devices mentioned in the specifications or shown on the plans.

1.4 INTERPRETATION

In the event of a question of interpretation of any of the standards or regulations, the same shall be determined by the Commissioner of Education.

All code references are current with the preparation of this *Guide*. Where Standards are changed or revised the latest published requirements will apply.

1.5 RESPONSIBILITY

1.5a Architects and Engineers

The responsibility for the structural and mechanical design of a school building, and for its alteration or addition is that of the architect and/or engineer retained by the board of education.

1.5b Board of Education

It is the responsibility of the board of education and the school administrator to prepare immediate and long-range plans for plant expansion and improvements, to retain a qualified architect to design facilities in accordance with information and requirements provided by the board and its chief administrator, and to have the construction supervised through its architect.

1.5c Guide Compliance

It is the responsibility of the architect or engineer to make certain that his plans and specifications conform to the regulations and standards set forth in the *Guide for Schoolhouse Planning and Construction*.

1.5d State Board of Education Not Responsible for Building

No responsibility is assumed by the State Board of Education for the structural features of the building, the efficiency of the mechanical system, the grade of materials, or the quality of fixtures installed.

1.6 WHO MAY PREPARE PLANS

All plans and specifications for school building work of any nature must be prepared by an architect, a mechanical engineer, or structural engineer registered to practice in the State and within the limits covered by such registration.

Each page of the plans and the title page of the specifications shall bear the signature and embossed seal of the architect and consulting mechanical or structural engineer. The name, signature, and embossed seal of the consulting mechanical and/or structural engineer shall be placed on his own plans.

1.7 HOW TO READ THIS GUIDE

This *Guide for Schoolhouse Planning and Construction* is designed to serve a three-fold purpose. Prepared primarily for architects, school board members, and educators, it is framed especially to present a convenient outline of all applicable mandatory provisions. These provisions occur at various places in the *Guide,* the implication being that it should be read carefully in its entirety, particularly by those responsible for compliance with the statutes and the regulations of the State Board of Education.

Its second purpose is to point out, to prospective builders of school plants, certain design features which, although not required, are considered to be highly desirable and are strongly recommended.

The *Guide* contains a third type of material, which is designed to introduce, explain, interpret, or enlarge upon mandatory and recommended

provisions, or to present a point of view that will form a basis for discussion and a guide for contemplated action.

1.8
ASSISTANCE IN PLANNING

Consultant service is available from the Department of Education at no charge to assist boards of education, administrators, and their staffs in the planning of specific facilities or a complete school plant. From time to time bulletins on specific facilities, such as the health suite, the industrial arts shop, etc., are produced by the Department of Education. Those wishing to have a list of available bulletins or requesting the services of consultants should write or call the Director of School Planning Services. Local fire officials should be consulted with reference to the availability of water and hydrants for fire protection.

100. PLANNING A SUCCESSFUL SCHOOL BUILDING PROGRAM

A modern instructional program which offers each child maximum opportunities positively relates to the physical environment evolved from the sound principles of building planning. The successful carrying-out of the school building program depends upon an orderly procedure designed to make certain that all important phases are included. The following steps are offered as guides.

101. PROGRAM PLANNING

The educational program is developed to meet the needs of the children of the community. Assistance in program planning is available to the local district from many agencies. The State Department of Education has consultants in the elementary and secondary fields, special vocational areas, and atypical education. Arrangements can be made for this assistance through the Bureau of School Planning Services or the office of the county superintendent of schools. (See Section 1.8)

102. TIME ALLOCATION

Adequate time must be allowed to permit the development of a comprehensive and accurately documented plan.

103. PUPIL ENROLLMENT PROJECTIONS

An estimate of future pupil enrollment for the school district is made and projected grade by grade for at least a ten-year period.

104. CONTEMPLATED FACILITIES

The kind and extent of school plant facilities needed is carefully determined, based on program and number of pupils.

105. EVALUATING EXISTING FACILITIES

The existing plant is carefully evaluated and its effective utilization as an integral part of the contemplated plant expansion determined.

106. EDUCATIONAL SPECIFICATIONS: PREPARATION

Educational specifications are prepared in writing, detailing all the facilities considered desirable for the program. Estimates of desired dimensions and square footage for each area should be provided, together with an explanation of their proposed utilization and relationships. (See Section 601.1) This should be prepared under the direction of the superintendent of schools or administrative principal, with the assistance and involvement of the administrative staff, faculty, board of education, citizens, pupils, specialists, and educational consultants.

107. EDUCATIONAL SPECIFICATIONS: APPROVAL

The educational specifications are approved by the board of education and so recorded in the minutes.

108. SELECTION OF ARCHITECT

The architect is selected through approved procedures. Assistance in the manner of selection can be had from the New Jersey Society of Architects, 120 Halsted Street, East Orange, New Jersey 07018.

109. SELECTION OF SCHOOL SITE

The school site is selected. (Criteria for the selection of a site will be found in Section 300.)

110. SCHEMATIC PLANS: PREPARATION

The approved educational specifications are submitted to the architect who prepares a solution to the problem in the form of schematic plans and an estimate of the cost. (See Section 504.)

111. SCHEMATIC PLANS: BOARD APPROVAL

The local board and its staff study the schematic plans. The plans, educational specifications and cost estimates shall be submitted to the Department of Education for review and comment. If modifications in the plans are found to be desirable, it is at this point that they can be made with the least delay in expediting the program. The process continues until satisfactory plans have been developed. The board then officially approves the plans and determines the proposed method of financing the project.

112. LOCAL PLANNING BOARD REVIEW

The proposal is officially submitted to the local planning board. It is permitted 45 days to consider the

project. (N.J.S.A. 40:55-1.13) Neither approval of plans and specifications nor a building permit from the municipality is required. (18A:18-25)

113.
EXTENSION OF CREDIT HEARING

When an extension of credit is necessary, a date for a hearing is arranged with the Bureau of Business Services of the State Department of Education. This can be done directly with that Bureau or through the offices of the county superintendent of schools.

114.
SCHEMATIC PLANS: SUBMISSION

Schematic plans shall be submitted to the Bureau of School Planning Services for review at least thrity days prior to the hearing. (See Section 504.)

An official submission includes one copy each of a floor plan (preferably 1/16 scale), complete plot plan, and three copies of a cost estimate on official State form. If an addition, a floor plan of the existing facilities must be included, showing present and proposed utilization.

If extension of credit is not required, schematic plans shall be submitted to the Bureau before seeking local approval for funds. Good planning would indicate that this submission be at least sixty days prior to a referendum.

115.
PREPARATION FOR EXTENSION OF CREDIT HEARING

All necessary documents and data are prepared by local district officials in accordance with instructions from the Bureau of Business Services and the Division of Curriculum and Instruction and presented at the hearing on the extension of credit.

116.
STATE DEPARTMENT OF HEALTH

In preparing cost estimates, it is advisable to consult with the State Department of Health concerning the proposed method of sewage disposal. This will enable the architect to better anticipate cost for this utility and to determine if the proposed system is approvable.

117.
DIVISION OF LOCAL FINANCE HEARING

If the extension of credit application is approved by the Department of Education, the local district will be notified by mail of the date for a meeting with the Division of Local Finance.

118.
EXTENSION OF CREDIT: TIME FACTORS

Under existing statutes the Commissioner of Education is permitted 60 days for his consideration of the proposal. The Division of Local Finance is also permitted 60 days for its consideration following the approval from the Department of Education. These time factors should be recognized in establishing the date for a referendum and allowing for a public information program, as well as permitting time for absentee ballot advertising.

119.
LOCAL REFERENDUM

After approval has been granted by both state agencies, a local referendum may then be held if needed.

120.
PRELIMINARY PLANS: SUBMISSION

If the results of the local referendum are favorable, the architect prepares one set of preliminary plans which is submitted to the Bureau of School Planning Services for review. (See Section 505.) This step involves two separate reviews; one by the consultants for educational adequacy and a second by the architectural review staff with reference to *Guide* compliance. Two separate approvals are necessary.

121.
AUTHORIZATION TO PREPARE FINAL PLANS

If the preliminary plans represent a satisfactory solution to the building problem, tentative approval and authorization to proceed with the preparation of final plans is issued to the architect in writing, with copies to the superintendent of schools, the secretary of the board of education, and the county superintendent.

122.
FINAL PLANS: SUBMISSION

The architect submits for review two copies each of the final plans, specifications, and applications for approval. (See Section 506.)

123.
FINAL PLANS: APPROVAL RECOMMENDED

If the final plans and specifications are found to comply with the rules and regulations as set forth in the *Guide for Schoolhouse Planning and Construction,* the architect, the superintendent, the board of education, and the county superintendent of schools are advised that approval of the same has been recommended to the State Board of Education.

124.
FINAL PLANS: FORMAL APPROVAL

Formal approval of the final plans and specifications is made by the State Board of Education at its regular monthly meeting and official notice of such approval is sent to the local board of education, the architect, and the county superintendent.

125.
ADVERTISING FOR BIDS

Advertising for bids may proceed as soon as word is received that approval of the plans and specifications has been recommended. (See Section 501.7 to 501.9)

126.
ACCEPTANCE OF BIDS AND AWARD OF CONTRACTS

Attention is called to 18A:18-2 of the *Statutes* which provides that bids may not be accepted or contracts awarded until after the plans and specifications and all addenda thereto have been approved by the State Board of Education.

127.
APPROVAL OF ADDENDA

The architect shall submit two copies of all bulletins * and addenda to the Bureau of School Planning Services simultaneously with their issuance to contractors or other parties concerned. No contracts may be awarded until the amended plans and specifications are approved.

(*Bulletins are defined as explanatory material only).

128.
QUALIFICATION OF CONTRACTORS

Before opening the bids, the board of education determines that each person submitting a bid is qualified by the Department of Education as required under 18A:18-9 of the *Statutes* (See Section 501.9)

129.
APPROVAL OF BIDS

A copy of the proposed bid awards shall be submitted to the Bureau of School Planning Services (on the proper form) for approval prior to the signing of construction contracts.

130.
FILING OF CONTRACTS

Copies of the signed contracts are forwarded to the Bureau of School Planning Services for review and filing within ten days after signing. The contracts shall be filed by the secretary of the board of education.

131.
CHANGE ORDERS: SUBMISSION

The architect shall submit two copies of all change orders to the Bureau of School Planning Services for approval prior to making such changes. No change orders may be authorized until after contracts have been awarded.

132.
CHANGE ORDERS: APPROVAL

Upon approval of change orders by the State Board of Education, a copy of the change order marked "Approved", will be sent to the board of education for its information and files. The architect is notified of the approval by letter.

133.
PRELIMINARY INSPECTION

The architect, or the consulting engineer where this is pertinent, shall give written notice to the Director of School Planning Services when rough mechanical work is completed so that an inspection can be scheduled of all work in place and written approval given before proceeding to close in the work. Lathing and plastering or other closing-in may not proceed without written approval.

134.
FINAL INSPECTION

When in the opinion of the architect the building is completed, he shall notify the Bureau accordingly and final inspection will be made.

135.
FINAL INSPECTION REPORT

If the inspection indicates that the work has been completed in accordance with the plans and specifications, notice to that effect will be issued to the board of education, the architect, and the county superintendent.

136.
ACCEPTANCE OF BUILDING

The board of education accepts the building upon certification by the architect that the project has been completed in accordance with the approved plans and specifications.

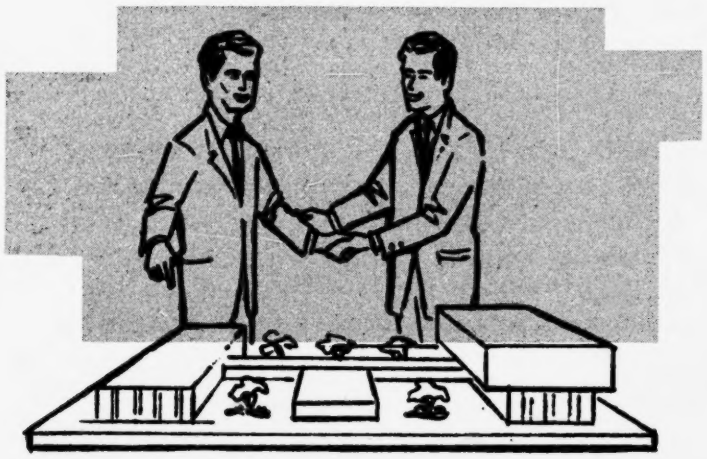
137.
ORIENTATION OF STAFF

The board of education should arrange to have the superintendent of schools, his staff, custodians, maintenance staff, and educational staff oriented in the operation and maintenance of the building in order to utilize the building as effectively as possible and to assure its proper care and maintenance.

138.
CONTRACTOR PERFORMANCE REPORTS

Upon completion of the construction, the local board of education shall submit reports to the Bureau of School Planning Services on the performance of all contractors. (18A:18-14)

200. DESIRABLE FEATURES



201. GENERAL

201.1 Administrative and Other Offices

A well-planned office unit should provide space for the reception of students and visitors, the work of secretaries and student-assistants, a private office for each administrator, work areas for other staff members, fire resistant and safe storage of money and records, storage of office supplies, the use of duplicating and other machines, facilities for pupil-personnel teams, and conference rooms.

A health unit should include a waiting area, an examination room, and separate rest rooms for boys and girls, each equipped with one or more cots with lavatory and toilet facilities conveniently accessible.

201.2 Teachers' Areas

Careful consideration must be given to the provision of suitable workrooms and rest rooms for teachers to use in their free periods. Even the smallest schools should contain a general teachers' rest room with comfortable seating and adjoining toilet rooms, with entrance other than from the main lounge. Larger schools may require more than one such area. There is also a need for offices or workrooms and conference rooms where teachers can prepare as individuals or in groups for their classroom assignments. These areas should be provided with individual study desks, tables and chairs for group work, a professional library of books and magazines, a bulletin board, typewriters, a duplicating machine, and other equipment required by the type of program being conducted. Teachers should be provided with an attractively designed and furnished private dining room where they can relax in an adult atmosphere for a few minutes during their lunch hour. All teachers' rest rooms should be well ventilated. Teachers' rest rooms should be provided with a small kitchenette unit where warm beverages and light snacks may be prepared.

201.3 Storage Areas

Most schools of the past have not been provided with adequate storage space. In order to rectify this situation, careful study and teachers' consultation should be given to the requirements of each of the school's departments. The Department of Education publishes special bulletins relating to the planning of various specialized facilities, especially in the high school. These bulletins are very helpful in planning for adequate storage space.

201.4 Chalkboards

Several new types of chalkboards are available in a variety of colors. Because of their higher reflection factors, they are replacing slate boards in most schools. If magnetized, teaching devices can be used to advantage, steel chalkboards may be desirable. Recent experiments have revealed that in many cases chalkboards which were mounted low enough for pupils to use were not high enough for pupils to see items which teacher had written on the board. To remedy this situation, the best solution is to use chalkboard sections which are easily adjustable in height. If budgetary requirements make this impossible, it is suggested that the top of the fixed chalkboard be located as high as possible and still be within the reach of the teacher.

The recommended heights for fixed chalkboards from the floor to the chalk rail are 26" for kindergarten, 28" for grades one to three, 30" for grades four to six, 32" to 34" for grades seven to nine, and 34" to 38" for grades ten to twelve.

The top of all fixed chalkboard sections should be provided with a tack strip and map rail.

201.5 Display Boards

Two types of display boards are considered desirable for most classroom situations: tackboards displaying two-dimensional materials and pegboards for exhibiting three-dimensional items. All such boards should be located at heights appropriate to the ages of the children being served. In some instances, they may extend from the baseboard to the top of the reach of the teacher — or even to the ceiling.

201.6 Display Cases

In past years, school display cases were primarily used for the purpose of exhibiting the school's athletic memorabilia. Current educational philosophy dictates that more display cases be provided and that they be located where they can be used to display educational exhibits or student projects without obstructing exitways.

201.7 Floor Materials

The most commonly used floor materials for general instructional rooms are asphalt tile, vinyl asbestos tile, and vinyl tile. For corridor floors, terrazzo is an excellent material to consider in addition to the above three types of tiles. Wood floors are recommended for wood-working shops and similar areas. Toilet room floors shall be of ceramic tile or other impervious material. Care should be taken to select floor materials which will be durable and easy to maintain. A higher cost of initial installation is usually justified by lower maintenance costs.

The use of carpeting for classrooms and other school areas has been tried in a number of schools and found to be very satisfactory. Although the original cost may be higher than materials ordinarily used, the lowered cost for maintenance can be an offsetting factor, and the acoustical properties of the rooms are markedly improved.

201.8 Acoustical Treatment

Some kind of acoustical treatment is recommended for all corridors, instructional rooms of all types, and cafeterias.

The type of material to be used should be noncombustible and suitable to the environment in which it is used. Corridor ceiling applications should be as durable as possible and easily replaced when damaged. Tile used in kitchens should have a surface which is easily cleaned. Carpeting, when used on classroom floors, acts as an excellent acoustical material. Selection of furniture with glides designed to prevent disturbing vibration and scraping noises will help to control noises at the point of origin.

201.9 Locks

All locks installed in school buildings should be master-keyed according to a carefully planned program which allows for future additions or modifications.

201.10 Internal Partitions

Insofar as it is practicable, internal partitions should be non-bearing so as to permit the maximum degree of flexibility in relocating room dividers. Where team-teaching or instructional groups of various sizes are to be used, there are a number of different types of operable walls which can be suitably employed as classroom dividers. Such walls should have the ability to reduce the noise transmission between the areas being divided. Large spaces without internal partitions are practicable when properly treated acoustically.

201.11 Number of Stories

In general, it is recommended that for reasons of safety and educational usefulness all school buildings should be designed with the smallest practicable number of stories. Because of their size, large schools may require areas with more than one story. More than two stories is recommended only for very large schools when the site is limited.

While it has not been positively determined that either one-story or multi-story buildings are less costly to construct, available evidence would indicate that the difference, if any, is so small as to be of little significance when measured against any advantage which may be had by either type.

One-story schools, with direct exits to the outside from all classrooms and assembly areas, are exempt from having to have the building equipped with an automatic fire detection system.

201.12 School Community Use

Experience has shown that combined use of school buildings by school and community groups may lead to increased problems of operation and administration.

Special provisions for such use should be incorporated into the design of the plant. Portable metal corridor gates, or gates which recess in the wall when not needed, are helpful in separating areas frequently used by community groups from other parts of the building. Such gates must be so located as to provide sufficient exits to meet requirements for the the maximum occupancy of the enclosed area. It is also desirable to provide separate storage spaces for materials and equipment.

201.13 Interior Finishes and Color Selections

The selection of interior finish material and colors is an important aspect of school plant planning and yet one which is often neglected. Care should be taken that a balance is maintained between serviceability and beauty. The school building is home to the pupil for almost half of his conscious hours, and the school atmosphere should therefore be as pleasing as possible. A variety of colors and textures is desirable in all schools. While classrooms require a reasonably quiet color scheme, there is stilll room for variety in these instructional areas, and the corridors, lobby, cafeteria, and other public areas offer many opportunities to introduce more lively colors into the overall scheme. Corridors in particular require special attention to reduce the long tunnel effect common to many large schools. Consideration should be given to the use of fire-retardant paint.

202
ELEMENTARY SCHOOLS

202.1 Classrooms

Most elementary schools are planned around a classroom which is designed to contain or facilitate almost all normal classroom activities of the pupils in the area. Considerable attention needs to be given, therefore, to the design of these rooms. Each instructional area should be provided with the following types of equipment: student wardrobe (unless corridor lockers are used), teacher's wardrobe, filing cabinet, storage cabinets, book shelves and/or carts, sink cabinet with drinking fountain, work counters, and movable classroom furniture of various types which will facilitate both individual and group work. Special equipment is also desirable for specially planned areas such as library, arts, science, and music centers. Equipment should be so located as never to impede safe exit from the room.

The amount of chalkboard and tackboard in each room should vary depending on the grade level and the instructional methods used.

All rooms should be equipped for the use of visual and auditory aids with adequate electric outlets, room darkening devices, projection screens, and map display rails.

There is little agreement on the question of which storage units should be built-in and which should be portable. There seems to be some merit, however, in being able to move storage units about the room to form temporary partially divided areas for special individual or group activities, and it is likely that these activities will increase in future years.

202.2 Auxiliary Spaces

A good elementary school *must of necessity contain* more than self-contained classrooms. Some of the auxiliary spaces which are normally provided in a good elementary school are general office, principal's office, conference room, nurse's suite with examination room, rest area and toilet room, remedial room, library with office-workroom, cafeteria and allied preparation areas, gymnasium or playroom, auditorium or stage in a multi-purpose room, teachers' lounge and toilet facilities, and one or more activities rooms for special instruction or group work in fields such as music, shop, fine arts, home economics, and science.

202.3 Corridor Lockers

Corridor lockers are recommended for upper elementary school classrooms since their use will free one additional wall for display or other use and permit more flexible utilization of the space in the classroom. Locks may not be required at this grade level; however, when used, separate master-keyed combination locks are usually preferred.

202.4 Playground Toilet Facilities

It is desirable to provide an outside entrance from the playground to at least one toilet room for each sex. It should be possible to isolate these rooms from the main building if they are to be used for summer playground activities.

202.5 Multi-Purpose Rooms

Movable partitions are especially useful if the room is designed as both a cafeteria and play room. A fixed or portable stage is highly desirable. Attempting to adapt a multi-purpose room to the needs of too many activities is seldom found to be practicable. It is better to have a room designed to serve the more important activities well than to try to meet the needs of every program.

The ceiling height of the multi-purpose room should be appropriate to the grade levels involved, the type of activities anticipated, and the size of the room. A ceiling height of 12 feet would be the bare minimum and would not permit many games commonly played in elementary schools. If basketball and other active games are to be included in the program, a ceiling height of 18 feet is adequate for elementary school purpose.

202.6 Classroom Exterior Doors

When funds permit, it is desirable to provide exterior doors for all elementary school classrooms so that pupils may have direct access to the playground or outside instructional areas. This is especially important for the kindergarten and primary grades.

202.7 Playground

Separate play areas are recommended for the kindergarten, primary, and intermediate grades. Some paved area should be available for each level. All apparatus should be selected with three basic things in mind: (1) Is it safe under normal use? (2) Is it appropriate for the age levels involved? (3) Does it serve an educational function?

203 SECONDARY SCHOOLS

203.1 Student Activities Space

Careful planning is required to provide spaces for extra-curricular activities of various types including, but not limited to, the following: school newspaper, yearbook, other publications, school bank, school store, ticket sales, student government, and clubs.

203.2 Auditorium

Experience indicates that too often the auditorium is the least-used space in a secondary school, a fact which is difficult to justify either economically or educationally. One attempt to solve the problem from the economic standpoint has been to have smaller auditoriums, seating perhaps one-half of the student body. A more recent and surely more justifiable approach, both economically and educationally, is to design an auditorium with folding partitions and other devices which make it practicable to use it satisfactorily for a multitude of purposes and still have a facility well suited to its primary function. The use of auditoriums for study-hall purpose dictates the need for adequate lighting and seats equipped with folding tablet arms.

203.3 Stage

A stage depth of not less than 25 feet is desirable for all high school auditoriums. Ample off-stage space, not including dressing rooms and other auxiliary rooms, should always be provided. Both sides of the stage should be accessible from backstage.

203.4 Science Rooms

Wherever possible, separate science rooms should be provided for each of the major sciences. When this is not possible because of limited enrollment, special care needs to be given to the design of the room layout and equipment so that the design is suitable for all subject matter to be covered.

Separate storage areas for chemistry and physics are always required to prevent damage to the delicate physics apparatus by chemical fumes. The layout of work stations is important. Some have found the perimeter type to have definite advantages.

Combination lecture-laboratory rooms are preferred for all science activities. Separate classrooms and laboratories are not desirable. Equipment needs must be carefully studied and made

a part of the planning process because of the necessity for properly locating utility connections and drainage lines.

Provisions for individual research should be made in the science suite. Such facilities should be located where students can work with indirect supervision from faculty members occupied with other primary teaching responsibilities.

203.5 Gymnasiums

The ceiling height for a secondary school gymnasium should be approximately 20 to 22 feet. Folding bleachers are considered the most practical way to provide maximum seating capacity for athletic and other similar events and still free most of the floor area for physical education classes. Overhanging balconies are never recommended.

204
ELECTRICAL

204.1 Intercommunication Systems

All large schools should be equipped with an intercommunication system which has adequate flexibility to permit its use as a teaching device. This system should be designed to provide broadcast listening on both the AM and FM frequencies, and the pickup and broadcasting of special school programs or events, including the ability to record and play back at a later time. The location of the central control panel is especially important. To assure privacy many school administrators prefer to have a separate telephone system. Microphone outlets should be provided at such locations as the gymnasium, auditorium, lunchroom, bus-loading platform, athletic field, and playground.

204.2 Electronic Aids

The use of television and other electronic aids will increase rapidly in years to come. Insofar as is practicable, consideration should be given to having adequate wiring, antennas, conduits, etc. to provide service for a growing use of a variety of electronic aids.

205
SANITATION AND PLUMBING

205.1 Toilet Room Shelves

Main toilet rooms in junior and senior high schools should be provided with shelves about 10" wide, upon which students can place books and other possessions while using the facilities. In girls' rooms these shelves can double as makeup counters if located under the mirror.

205.2 Individual Toilet Rooms

Individual toilet rooms are recommended for all classrooms serving grades one through three.

205.3 Public Toilet Rooms

The auditorium, gymnasium, and other areas normally occupied by large numbers of visitors should have adequate toilet rooms located convenient to the principal entrances or lobbies. A considerable saving in construction cost can often be achieved by locating general pupil toilet rooms so as to serve these areas as well as classroom areas.

205.4 Shower Rooms

Gang showers are recommended for boys. Each community should decide the type of showers to provide for girls in terms of local custom and desires. All shower rooms should have some provision for liquid or bar soap.

205.5 Towel Service

Many schools have found it advisable to provide a towel service so that each pupil may obtain a clean towel for each shower. Some schools do their own laundering in order to provide the service most economically.

205.6 Insect Screens

Insect screens should be provided for all windows in the lunchroom, kitchen and related areas, home economics cooking rooms, biology room, and other areas which tend to attract flies. Such screens should be operable from the inside.

205.7 Kitchen Employees

Kitchen employees should be provided with a toilet and dressing room with lockers and showers. The rooms should be near to but not opening directly into the kitchen.

205.8 Classroom Drinking Fountains

A desirable feature of every elementary classroom is a drinking fountain, which may be attached to the classroom sink.

205.9 Drinking Fountains

Whenever the budget permits, it is recommended that electrically cooled drinking fountains be used in corridors or other public areas. Outside drinking fountains should be located convenient to a pupil playground or athletic areas and any other areas where large numbers of pupils may congregate.

205.10 Swimming Pool

A swimming pool is a most valuable adjunct to a modern health and physical education program.

205.11 Gym Lockers

Every pupil should be provided with a small locker for the storage of his gym clothes. In addition, there should be enough large lockers for the maximum number of pupils who might use the gym at any one time. Special gym lockers are usually provided for one or more varsity sports programs.

206.
GENERAL SAFETY

All standards and codes elsewhere noted in this *Guide* related to fire safety, construction materials,

equipment, exiting or other factors concerned with pupil and staff safety are required to be met. Buildings should be designed for safe and uncongested flow of pupil traffic. For the ultimate in pupil and building safety, boards of education should consider an automatic sprinkler system.

207.

PHYSICALLY HANDICAPPED

Consideration should be given to the growing use of schools by pupils who are physically handicapped by orthepedic defects, cardiac disorders, and any other physical disabilities. The presence of an entrance which permits easy access to the building from the ground level or the availability of an elevator in a multistory building may often be the controlling condition which permits such pupils to continue attending school.

It is recommended that the following document be carefully reviewed to make certain that suitable facilities for the handicapped have been included in the design for any new school building: *Making Buildings and Facilities Accessible to and Usable by the Physically Handicapped.* The National Society for Crippled Children and Adults, 2023 West Ogden Street, Chicago, Illinois 60612

208.

VENTILATION

Due concern for the health of the pupils and staff requires that they live and work in rooms which are properly ventilated so as to be free of noxious gases, dust, odors, and excess humidity. Consideration should be given to having a ventilation system which will positively maintain such conditions.

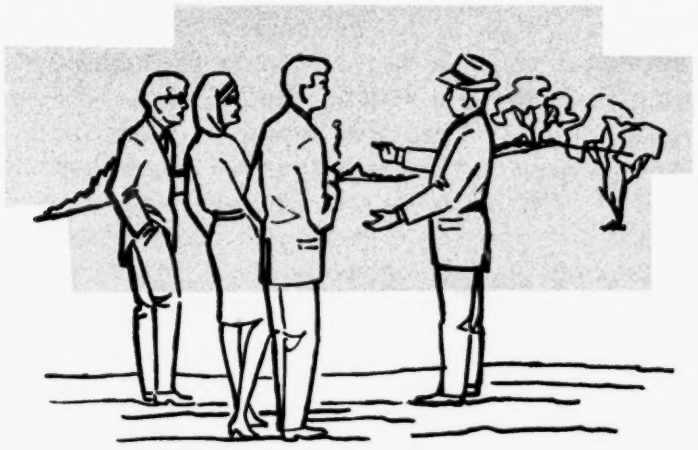
208.1 Ventilation Economics

Where economy is paramount, consideration may be given to the following:

208.1a Make-up air for gymnasium locker rooms may be provided entirely or in part by pulling exhaust air from the gymnasium proper.

208.1b Make-up air for the cafeteria kitchen may be provided entirely or in part by pulling exhaust air from the main cafeteria.

300. SELECTING A DESIRABLE SCHOOL SITE



301. GENERAL

School sites should be selected well in advance of actual needs. The selection of a site for a school building involves technical problems and educational factors which require the co-operative efforts of the professional parties concerned. Suggestions for selecting a school site must be sufficiently broad and flexible to allow for variations in the character of the school district in which the site is located, the size and type of school to be built, and the nature of the educational program activities to be accommodated.

It is recommended that consideration be given to the following factors in site selection: size and shape, topography, accessibility, environment, safety, health of pupils and school personnel, accessibility of public utilities and services, surface and sub-surface conditions, the orientation of projected building on the site, initial cost and development cost, and the over-all master plan for schools in the district.

Before any action is taken to purchase or otherwise acquire sites intended for future schools or school expansion, it is strongly recommended that the consultative services of the Bureau of School Planning Services in the State Department of Education be requested. Within practical limitations of staff, the Bureau will assist in evaluating sites for school districts. Approval by the Bureau consultants will signify to the board of education that a thorough investigation and careful weighing of a number of factors have been made in approving the prospective school site. This approval will do much to create a favorable reaction among voters when a referendum is required. By virtue of specialized training and wide experience, there are other persons particularly knowledgeable in the field of site selection who may be called upon for expert assistance. Advisory services should be utilized in selecting a suitable setting for the school plant.

302. SIZE OF SITE

The size of any school site should be determined largely by the nature and scope of the contemplated educational program. Actual layouts of the spaces needed by the various phases of the program should be made. Because the site-size problem varies in accordance with the needs of the type of school organization and in terms of the age and development status of the community or school district, the following rules must be taken as minimum for which all should strive and which most should exceed.

302.1 Primary Schools

It is suggested that there be provided a minimum site of 10 acres plus an additional acre for each 100 pupils of predicted ultimate maximum enrollment. Example: A primary school of 500 pupils, projected maximum enrollment, would have a site of 15 acres, minimum.

302.2 Junior High Schools and Middle Schools

It is suggested that there be provided a minimum site of 20 acres plus an additional acre for each 100 pupils of predicted ultimate maximum enrollment. Example: A junior high or middle school of 500 pupils, projected maximum enrollment, would have a site of 25 acres, minimum.

302.3 Senior High Schools

It is suggested that there be provided a minimum site of 30 acres plus an additional acre for each 100 pupils of predicted ultimate maximum enrollment. Example: A senior high school of 1,000 pupils, projected maximum enrollment, would have a minimum site of 40 acres.

302.4 Need for Larger Sites

Larger school sites have become necessary for a variety of reasons. On-the-site parking for pupils, faculty, and the public have made increased demands on school space. Growing communities, which have not been able to make provision for adequate parks and recreation areas for the public, have found it both desirable and economical to combine public recreational and school recreational areas. Where public park land adjoins a public school site, it should be made suitable for and available to the school for its use in its out-of-doors program. Sometimes schools and communities jointly plan school and community facilities to get the maximum use of a site.

The growing popularity of one-story schools in place of multi-storied structures makes its demand upon space, as does also the pressing realization that future additions to the building will probably be necessary in the not-far-distant future. It is true, too, that some schools like to have adequate space for school gardens and an agricultural demonstration area, and rate highly their educational value. The trend for providing space for a great variety of outdoor teaching areas necessitates larger sites. Larger sites result in substantial improvements in educational programs, community services, and efficiency of operation.

Experience has indicated that ultimate site requirements should be met with the initial site acquisition because land adjacent to a new school soon becomes occupied with housing developments.

Almost all suburban communities are burgeoning in population. Their possible destinies, in point of future population, are only vaguely felt and dimly perceived. A small restricted school site, a few years hence, is likely to prove a ponderous obstacle to adjustment to new conditions, and may prove to be one of the most compelling factors in the creation of a "blighted" district. A large school site has always the opposite effect.

Even for small schools a large site is essential. Actually for many activities such as baseball, tennis, track, soccer and football, the same space needs are felt by both large and small schools.

The shape of a site should be measured in terms of the probable functional requirements of its use. Ordinarily, satisfactory arrangements can be achieved on a rectangular site with dimensions in a ratio of approximately three to five. It is possible, however, to secure suitable arrangements on irregularly shaped sites through appropriate building design and placement. The site should have sufficient frontings, however, to permit a proper design with adequate walks and driveways.

303.
TOPOGRAPHY OF SITE

Fine grounds embellish and provide an appropriate setting for a fine school building. A natural elevation with satisfactory approaches for avoiding long or difficult climbs makes a desirable setting. The site should be free from drainage from contiguous territory and should permit proper drainage throughout at a reasonable cost. Rapid drainage and quick drying should characterize the parts of the plot which are expected to serve as recreational and play areas. A clay subsoil is not considered to be as satisfactory as sandy loam fertile enough to produce good lawns and vigorous landscaping. Topography is of necessity related to size of site. If, because of topography, portions of a site are unusable for certain necessary purposes, the total amount of land needed for a school must be reconsidered.

However, once adequate area is provided for the normal functions requiring reasonably level and cleared land, additional acreage can have a variety of characteristics. Wooded slopes, rock outcroppings, boulders, mounds, pits, streams, ponds, marsh and hills ... once considered undesirable for school purposes ... have been found to have tremendous value for many types of outdoor educational programs. Unlimited acreage, within the limits of economy and availability, is recommended to provide these exploratory opportunities and flexibility for the future.

304.
ACCESSIBILITY OF SITE

Schools should usually be located near the center of the present and the probable future school population which is to be served. Yet there are exceptions to this rule-of-thumb. Like the large supermarkets, schools are finding that a large fine site, perhaps removed from the center of population, is preferable to a small restricted site more centrally located. In other words, the amount of good space available is frequently a more compelling cause for site selection than is central location. The increasing ease of transportation tends to nullify the initial advantages of a centrally located site. In this case safety and convenience of approach are of greater relative importance.

Where transportation is involved, the maximum travel time for elementary pupils should rarely exceed thirty minutes and for secondary pupils one hour. Special paths for bicyclists should be planned, with covered racks for the vehicles.

305.
ENVIRONMENT OF SITE

Most school grounds are planned to contain lawns, foundation plantings to "tie" the buildings to the ground, hardy shrubs placed at the angles and curves of drives and walks, tall trees to frame the building, and trees planted in groves for shade. Among the common classes of plants used are shade trees, smaller ornamental trees, coniferous evergreens, broad-leafed evergreen shrubs, deciduous flowering shrubs, vines, and ground covers. Whatever is planted should be grouped with respect to height, color, and cultivation requirements.

Because attractive physical surroundings have an especially strong influence on youth, the environment of a school site is a very important factor. The activities conducted within a school call for quiet surroundings, clean fresh air, abundant sunshine, and freedom from disturbing noises and the turmoil of crowded neighborhoods. It is unquestionably true that the wholesome cheerfulness and beauty of the school site will pervade the entire school and be reflected in countless ways in the attitudes and work of the pupils. Isolation from undesirable commercial enterprises should be sought. If possible, close proximity to sanitariums and hospitals should be avoided. Resourceful treatment of landscaping can usually minimize the disfiguring effects of such essential but unsightly facilities as parking areas, service drives, and refuse-disposal units.

If community recreational use is planned, consideration should be given to setting aside a special area for picnic tables and fireplaces.

306.
SAFETY CONDITIONS OF SITE

A major objective in selecting a site is to provide conditions conducive to the safety of children. The

location of the building on the site should permit children to pass through a safety zone before being confronted by traffic dangers. If at all possible, children should not be forced, by the location of the school, to cross railroads, automobile speedways, or heavy traffic lines. The site should be free from fire, water, or land hazards. Automobile roads within the site should be constructed to accommodate one-way traffic only, with proper signs indicating clearly their directional use. Where buses are used for transportation, careful consideration should be given to the loading and unloading facilities, to achieve the maximum of safety for the children. Parking space should be provided properly related to school use. If possible, a separate parking space for school visitors, located near the main entrance, should be provided. Dividends will accrue when parking facilities used for evening functions are amply lighted.

It is frequently advisable, also, especially in elementary schools, to provide special playground areas for children in the lower grade.

307.
HEALTH OF PUPILS AND SCHOOL PERSONNEL

Since the building in its environment is expected to be a healthful place for human beings to live, work, and mature, there should be present no factor that will interfere with the natural lighting of the rooms, nor should the site suffer from excessive noise, odors, dust, or polluted air from industrial centers, streets, or unfinished playgrounds.

308.
ACCESSIBILITY TO PUBLIC UTILITIES AND SERVICES

Economy, as well as convenience and efficiency, would dictate that inexpensive access to gas, water, sewer, electric, and telephone service be considered in acquiring a site. Since it is recommended that all public utility services be placed underground, it can readily be seen that extensive pipelaying and wiring, connected with distant points, would involve large financial expenditures. Every effort should also be made to avoid the possible difficulties due to the presence of main utility lines on or over the site under consideration. When site facilities are planned, consideration should be given to outdoor drinking fountains, hose connections near the various courts and playing fields, and lights for courts, playground areas, driveways, and parking lots. A desirable feature in selecting a site would be to choose one near a source of public fire protection.

309.
SURFACE AND SUB SURFACE CONDITIONS

Minor shortcomings in an otherwise excellent site, such as occasional surface uneveness or rock outcroppings, need not count too heavily. These flaws may often be easily corrected, or better, turned to advantageous use.

Adverse subsoil conditions such as rock, poor bearing soils, high water levels, and soils impervious to water will usually cause difficulties and increase costs. Difficult site contours may cause substantial extra expense. Obviously, a site should not be seriously considered for a school building unless these matters have been investigated, and no building should be designed before its proposed location has been subjected to a thorough subsurface inspection by borings or other means acceptable to those responsible for design success.

Sites minus proximate public utilities should first be taken on an option which permits the privilege to drill for a potential water supply, and, at the same time, to test the overburden for percolation referenced to the requirements of the State Board of Health. A very expensive error can be made in failing to obtain a site from which potable water may be derived and into which the effluent from approved sewage treatment facilities may be discharged.

310.
LOCATION OF THE BUILDING ON THE SITE

It is advisable to locate the building on the site so as to take full advantage of the topographical features of the site, roads, streets, existing valuable trees, streams, or other features insofar as to do so is practicable.

Although schools have a reasonable set-back from the street line, for both safety and attractiveness, the utility of the site should not be sacrificed just for beauty. Schools with long beautiful approaches, set in the center of their site, usually constrict the amount of space that should be used for essential education and recreational purposes. The development of the various areas for these activities should be in proper relationship to the buildings on the site.

311.
INITIAL COST AND DEVELOPMENT COST

The cost of land is quite low in comparison with the structures and other improvements erected on school sites. A poorly-suited parcel of land will seriously restrict possible development and may increase building costs to a marked degree. Therefore, careful evaluation and wise selection among sites available are important steps in securing maximum value for project funds.

Site costs really include both purchase price and development cost. Both are seriously considered in any realistic site evaluation. In comparing possible sites, initial cost alone can lead to serious delusion. It is particularly at this point that the architect can be so valuable. A cost comparison table should be prepared for each of the favored sites being considered, listing, besides initial costs, estimates of the costs for:

Clearing and Grubbing	Storm Drainage
Demolition and Removals	Water Supply
Earthmoving	Sewage Disposal
Rock Removal	Walks, Drives, and Paving

Underdrainage
Electrical Service
Athletic, Other Facilities
Engineering, Boring Sub-soil Analysis
Sodding, Topsoiling and Planting
Fencing, Gates, Barriers
Transportation Cost Differences
Noise and Pollution Control

The total of these costs with the cost of acquisition will give a reasonably close picture of the true site costs involved and a more rational basis for choice.

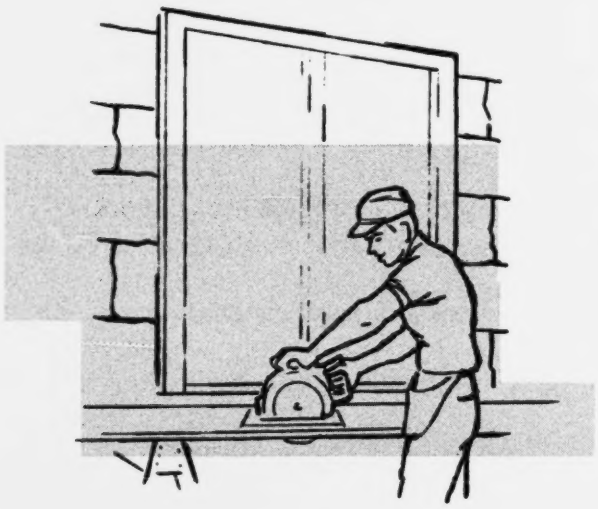
312.
CONSIDERATION OF LOCAL AREA MASTER PLANS

Ideally, a site acquisition is planned for several years in advance of need, as a responsibility of the local board of education. Careful studies should be made of population trends, industrial, commercial and residential developments and other factors indicative of when and where new school sites will be required.

Community and regional master-plans, where existing, should be reviewed for their probable influence on the future of the local school system. Land-use maps are most frequently found where there is community planning and urban redevelopment. Such maps can provide much valuable information. Geodetic and soils survey maps are available and are most useful in preliminary studies of prospective sites. Other sources of basic information to be consulted in wise planning would include: pupil enrollment forecasts by the school administration or other experts, utility company studies, realtor and developers' activities, aerial photographs, highway maps, reports of various land-use specialists, pre-school or pupil spot maps, and dwelling unit maps. The nature of the local situation will govern the choice of devices or procedures to be used.

Boards of Education are required to submit a copy of its plans to the local planning board for review in those municipalities where such agencies have been established.

400. THE MODERNIZATION OF EXISTING SCHOOLS



Almost as urgent as the construction of new school buildings in New Jersey is the renovation, rehabilitation, and modernization of some of our existing school plants. Alterations in present facilities are least effective when haphazardly made; they are most effective when they are part of a carefully planned program of improvement.

Many school buildings of necessity have been continued in use, even after they have approached obsolescence. Because boards of education have desired not to spend too much money on such old buildings, repairs and maintenance costs have been pared to the minimum. In many instances safety conditions have grown increasingly worse, often aggravated by the combustible interior construction of the buildings.

In such buildings it is not uncommon to find ancient toilet installations located in the basement: heating plants operating ineffectively on borrowed time; improper and inadequate lighting reduced to its lowest possible factor by dingy walls, somber ceilings, and dark woodwork; classroom facilities insufficient to meet pupil and teacher needs in today's educational program; and unimproved school sites deficient in provisions for proper outdoor activities. The health, safety and comfort of pupils housed in such buildings merit the sincere attention of boards of education.

In many older buildings, programs involving major improvements can be undertaken, and will prove both advantageous and economical. Even a minor improvement program, possible in any building, will produce astounding benefits to pupils, teachers, and community. Interiors can be painted to develop the maximum reflection values of walls and ceilings. Safety is augmented if fire-retardant paint is used. Artificial lighting can be improved by the installation of better fixtures and by raising the wattage. A better visual environment is easily obtained even in the oldest buildings, and will pay dividends in the protection of children's vision.

It is neither necessary nor advisable for boards of education to postpone improvement programs until their resources permit them to embark upon the construction of new buildings. A planned survey of existing conditions will realistically approach the problem of providing better opportunities for those pupils whose education is at present handicapped by obsolete facilities. The rejuvenation of existing school plants is often the first step that should be taken to protect the safety, sight, health, and comfort of pupils.

It is the policy of the Bureau of School Planning Services to review final plans for alteration work as soon after receipt of the plans as possible. However, boards of education and architects are urged to submit plans for such alteration work as far in advance as possible in order to properly schedule actual construction during periods when the school building may not be occupied.

500. PLAN PREPARATION, FILING AND APPROVAL

501. STATUTORY REQUIREMENTS

501.1 Plan Filing and Approval

No contract for the erection, improvement or repair of any public school building or any part thereof shall be made until and after plans and specifications therefor have been submitted to and approved by the State Board of Education. A copy of the plans and specifications as approved shall be filed forthwith with the State Board of Education. (18A:18-2)

501.2 Changes in Plans and Specifications

No change in the plans or specifications shall be legal unless the same have been submitted to and approved by the State Board. A copy of all changes as approved shall be filed forthwith with the said Board. (18A:18-2)

501.3 Filing of Contracts

A copy of the contracts for the erection, alteration or repair of the whole or any part of the school building and for the furnishing thereof shall be filed with the State Board within ten days after the same have been signed. (18A:18-22)

NOTE: The contracts shall be filed by the secretary of the board of education.

501.4 No Municipal Permit Required

No board of education of any school district nor any board of education of a county vocational school shall be required to secure the approval of its plans and specifications for the erection or alteration of any school building or vocational school building or any part thereof by the municipality therein; nor shall any board of education or any board of education of a county vocational school or any contractor doing work in connection with school buildings or county vocational school buildings be required to secure a building permit from the municipality. (18A:18-25)

501.5 Separate Plans and Specifications

In the preparation of plans and specifications for the erection, construction, alteration or repair of a public school building, when the entire cost of the work will exceed two thousand dollars in amount, the architect, engineer or other person preparing such plans and specifications, shall prepare separate plans and specifications for:

1. The plumbing and gas fitting work;
2. The heating and ventilating systems and equipment;
3. The electrical work, including any electrical power plant;
4. The structural steel and ornamental iron work;
5. All other work and materials required for the completion of the project. (18A:18-3)

501.6 Contract Bidding

In the erection, construction, alteration or repair of a public school building, when the entire cost of the work will exceed two thousand dollars in amount, the board of education shall, in the manner provided by law, advertise for and receive separate bids for the plumbing and gas fitting work; the heating and ventilating systems and equipment; the electrical work, including any electrical power plant; the structural steel and ornamental iron work; and all other work and materials required for the completion of the project.

The board of education shall, in the manner provided by law, also advertise for and receive single-overall bids for all of such work and materials. (18A:18-4)

501.7 Advertising for Bids Required

No contract for the building of a new schoolhouse or for the enlargement of an existing schoolhouse shall be entered into without first advertising for proposals therefor. No contract for repairing of an existing school house at a cost of more than two thousand dollars shall be entered into without first advertising for proposals therefor. The advertisements required by this section shall be made under such regulations as the board may prescribe. No board of education shall advertise for bids until the Director of School Planning Services informs the same that he is recommending approval of plans and specifications to the State Board of Education.

501.8 Bid Must Conform to Specifications

No bid for building or repairing schoolhouses or for supplies shall be accepted which does not conform to the specifications furnished therefor, and all contracts shall be awarded to the lowest responsible bidder. (18A:18-20)

501.9 Contractor Classification

Every board of education shall require that all persons proposing to bid on any contract with the

board for public work, the entire cost whereof will exceed $10,000, shall first be classified by the State Board as to the character and amount of public work on which they shall be qualified to submit bids. So long as such requirement is in effect, the board of education shall accept bids only from persons qualified in accordance with such classification. (18A:18-9 as amended by Chapter 188, Laws of 1968)

501.10 Domestic Materials

Architects, Engineers and Boards of Education are advised to become familiar with the statutes on the use of Domestic Materials on Public Works, N.J.S.A. 52:33-1 to 52:33-4.

501.11 Wage and Hour Law

Architects, Engineers and Boards of Education are advised to become familiar with the Wage and Hour Law, N.J.S.A. 34:11-56.25.

502. BUILDINGS DEFINED

502.1 New Buildings

New buildings shall mean and include any building or unit of a building in which the entire work is new, or an entirely new addition connected to an existing building or any existing structure proposed to be remodeled or enlarged by building into it fifty per cent or more of new work based on the square foot area of the existing building.

502.2 Existing Buildings

Existing buildings shall mean and include all buildings erected, remodeled or enlarged prior to the adoption of this section of the *Guide* on September 1, 1950, or to buildings remodeled or enlarged thereafter, provided that less than fifty per cent of the floor area is new work.

502.3 Changes in Existing Buildings

Any changes to existing structures necessitated by any remodeling or repairs, shall conform to the requirements as set forth. When existing schoolhouses are enlarged, these provisions shall apply only to the added portion or portions except where the provisions of 502.1 apply. It is recommended, however, that the old portions of such buildings shall be made to conform to the provisions of the *Guide* as far as practicable.

Boards of education may not make physical changes affecting the plan or the construction and utilities of public school buildings without first having plans prepared and submitted to the State Board of Education for review and approval. Plans and specifications for repair or replacement work which constitute a change in design, layout, or use of facilities as originally approved shall also be submitted for approval by the State Board of Education.

502.4 Acquisition and Use of Buildings for School Purposes

A board of education planning to acquire any existing building for instructional purposes through purchase, gift, lease or otherwise, shall comply with all procedures and regulations pertaining to the appropriation and use of capital funds and to have the building approved in accordance with the regulations of the State Board of Education which apply to the construction of a new building.

502.5 Returning Building to School Purposes

Any school building which has not been in use for educational purposes for a period of three or more years shall not be returned to use for such purpose unless the same has been inspected by the Bureau of School Planning Services and found to meet all requirements of the State Board of Education.

502.6 Movable Facilities

502.6a Any transportable, relocatable or mobile facility to be acquired through purchase, gift, lease or otherwise, must meet the State Board of Education minimum building requirements.

This is interpreted to include such standards as floor area, structural safety, heating, lighting, ventilation, sanitary facilities and drinking fountains.

502.6b Toilet facilities and drinking fountains may be used in adjacent buildings provided the facilities meet the State Board of Education requirements in these categories for the total school population. Otherwise the temporary movable facilities must be self-sufficient in drinking fountains and toilet facilities. Running water or water coolers may be used.

502.6c Before relocating any movable facility, approval must be obtained from the State Department of Education.

503 PREPARATORY PLANNING

The educational needs should determine the plan and design of the school; therefore, the educational program and the accommodations required should be definitely decided upon by the school board and its staff and then submitted to the architect as the basis on which to develop schematic plans. The architect should not be expected to develop the educational program. On the other hand how well his design meets the needs of the educational program will depend in no small degree on the completeness and accuracy of the information given him.

Boards of Education will find that the services of a well qualified consultant in school plant planning often will help them to plan buildings which are better adapted to the educational needs of the community. Frequently such consultants are able to indicate more economical ways by which needs may be met. Many times, errors, which would have resulted in a less satisfactory building or in increased costs, are thus avoided.

The experience of the State Department of Education indicates that the period of schematic planning offers fruitful opportunities for its cooperation with architects and boards in the evolution and development of building plans. It is the period in planning when the architect studies and endeavors to solve all the major problems that confront him in determining the overall scheme and layout of planned spaces and use to best meet the needs and functions of the desired educational program. Since final plans are basically a development of the preliminary plans, complete and comprehensive studies are practically essential at this stage of plan-development.

504
SCHEMATIC PLANS

504.1 Preparation

The schematic submission shall include a copy of a plan of each floor (preferably 1/16" scale), a complete plot plan, educational specifications and three copies of the cost estimate on the State form. If for an addition, floor plans of the existing building also must be submitted.

504.2 Submission

The schematic submission shall be made to the Bureau of School Planning Services for review and approval at least thirty days before the date of the scheduled hearing on an extension of credit. If extension of credit is not required, submission shall be at least sixty days prior to local authorization of funds.

504.3 Approval

If the schematic plans are approved, notice of such approval will be issued to the superintendent of schools, the secretary of the board of education, the county superintendent, and the architect.

505
PRELIMINARY PLANS

505.1 Preparation

Preliminary plans shall be submitted for review and approval and shall include the following:

505.1a A plot plan of the school property, drawn to scale, giving overall dimensions, the points of the compass, general topographical conditions, the location of existing structures and their relation to the proposed building, the relation of the school to highways and streets, and such physical features that present any deterrents in maintaining adequate protection for the safety, health, sight, or comfort of the pupils. The plot plan may be drawn to any scale, so long as it indicates with clarity the required features.

505.1b Preliminary floor plans shall be drawn not less than 1/16 inch to the foot, giving overall dimensions; the location, size, and intended use of all areas of the plans; the tentative layout of equipment features of special rooms including built-in equipment; future additions, a statement giving general method of heating and ventilating; and a description of the proposed method of lighting all instructional areas. If the proposed building is to have several identical rooms, one such room shall be shown in complete detail as being typical of such identical rooms.

505.1c There shall be a drawing, using the same scale, of elevations and sections to indicate the finished floor and ceiling levels and their relations to the finished outside grade, together with the steps or other features related to the exit facilities.

505.1d In the case of an addition to any existing building, it is required that a floor plan be submitted showing all areas, including existing sanitary facilities and exits and any proposed changes therein.

505.1e There shall be submitted with, or as a part of the preliminary plans, a statement showing:

The grade levels of pupils to be housed in the building.

The planned pupil capacity of the building.

505.1f Three important practices, followed undeviatingly by the State Department of Education, should be noted by those submitting preliminary plans:

Any preliminary plans not in conformity with the above requirements will be returned without review.

Preliminary plans, submitted prior to those submitted as the architect's solution of the planning to meet the educational program or "schematic" plans to indicate general schemes under consideration, will be reviewed when the Department's advice on specific or unusual cases is desired.

Prints, preferably black on white to identify preliminary plans from final plans, are required in submitting preliminary plans for review and tentative approval. These should be mailed to the Director of School Planning Services, State Department of Education, 225 West State Street, Trenton, New Jersey 08625.

505.1g Preliminary plans shall indicate a sewage system tentatively approved by the State Department of Health, or evidence that the sewage system will be connected to an approved municipal system.

505.2 Submission

The policy of the State Department is not to accept schematic or preliminary plans for review and tentative approval unless the architect submitting the plans has been regularly retained as the architect for the project. Preliminary plans will not be accepted for review and tentative approval until the project has been approved by the voters of the district, or funds have been legally appropriated.

505.3 Approval

In order to minimize the amount of revision in the final plans or working drawings, it is required that preliminary plans shall be submitted to and tentatively approved by the State Department of Education before the final plans are started. This permits the Department to review them in the light of requirements and to offer such constructive comments or advice that may be deemed advisable.

Notice of approval of the preliminary plans will be issued to the superintendent of schools, the secretary of the board of education, the county superintendent, and the architect.

506
FINAL PLANS AND SPECIFICATIONS

506.1 Preparation

The following specifications are suggestive of the information required in plans and specifications submitted for approval. They are not intended to enumerate all the items that should be covered but rather to establish uniformity in presenting data for review.

506.1a All specifications should be indexed for quick identification of individual items. It is recommended that the five sections of the specifications be in different colors for the same reason.

506.1b Specifications preferably should be of letter-size, bound at the left-hand side with covers the same size as the inside specifications, to facilitate filing and use.

506.1c The hardware schedule shall be included with the specifications. Plans and/or specifications shall clearly indicate the location of anti-panic hardware and door closers.

506.1d Wherever possible, drawings should not exceed 36" x 48".

506.1e Architectural, structural, and other kinds of mechanical work should be shown on separate drawings. They should be combined only when clarity and completeness are not impaired.

506.1f A key plot plan should be given on one of the drawings to indicate the location of the school building with relation to the school property and to existing structures when additions are made, and the established orientation of the building to points of the compass.

506.1g A better practice than that of submitting a key plot plan is to include with the final plans one sheet showing all of the items referred to under the preliminary plot plan, fully developed and including the contours and the finished grades at the building and the elevation of the first floor level. Included should be such items as the location of walks, drives, parking areas, play, and organized activity areas, kindergarten play yards, and adjoining streets and sidewalks. The boundaries, the size and shape of the entire school property, and the location of existing sewage disposal systems are other possible items for inclusion.

506.1h All drawings of any nature shall be fully dimensioned to give over-all and individual unit dimensions, both horizontal and vertical, for all portions of the building and should include the thickness of all walls, floors, and foundations, together with the present and finished grades at buildings.

506.1i General drawings shall not be less than 1/8" scale with plans for each floor and roof, elevations sufficient to indicate all exteriors of the building and materials, sections sufficient to show clearly all and any special conditions. Stairs, classrooms and corridors, furred ceilings, equipment and fixtures, floor construction, levels and thickness, wall construction, and typical windows should be shown.

Consideration will be given to any exceptions an architect may find necessary in the scale and layout of his plans due to the unusual size of the program, provided, however, that the clarity and completeness of information will not be impaired.

506.1j Typical details should be given at larger scale where necessary for clarity, providing complete information on wall sections, floors, and windows, with complete details for each type of window, and with data on the glass area, including the vertical distances of the sill and the vision area, if any, the top of the window glass above the floor, and the distance below ceiling. Stair details should show the construction and materials, riser heights and tread widths, the over-all dimensions of the stair runs, both vertical and horizontal, and the landing levels. Chalkboards and tackboards should be pictured. Built-in equipment, wardrobes, and all special features requiring details for proper development should be clearly portrayed.

506.1k Plumbing, heating, ventilating, electrical, and structural plans shall be scaled to conform with the general drawings. All mechanical and structural plans and details should be developed with the same clarity and completeness that are required for the general plans. The method of ventilating clothing storage areas shall be clearly indicated by plan and section.

506.1L There should be shown on the drawings the interior finish, including the floor, base, wainscot, wall, ceiling and trim. A complete door and window schedule should be given. The materials used in all walls, partitions, etc. should be indicated by means of symbol keys. A standard symbol key should also be used in describing electrical work. The use intended for each room or space should be written on the floor plans and not indicated by numerical cross reference.

506.2 Submission

Final plans and specifications submitted for review and approval by the State Board of Education shall meet the following requirements and shall conform with the best professional practices. They shall show clearly, accurately, and completely, information on all phases of the work to be undertaken.

506.2a Plans and specifications shall be submitted in duplicate, together with two copies of official application for approval properly filled out and signed as required.

506.2b Plans and specifications submitted for approval shall not be eligible for review and recommendations for approval until all the requirements of procedure have been complied with.

506.2c Incomplete plans and specifications will not be accepted for review.

506.2d All applications for approval shall be directed to the Secretary of the State Board of Education for the attention of the Director of School Planning Services and made upon the official blank form prepared and supplied by him. These forms are furnished upon request of the architect, and it is required that they be used instead of duplicate copies as made by the architect. The application must be signed by the architect, or the consulting mechanical or structural engineer in the case of specific planning being undertaken in these areas exclusive of other areas, and the president or vice president of the board of education. Applications signed by others will not be accepted.

All information requested on the application for approval must be given and all queries fully answered.

506.3 Approval

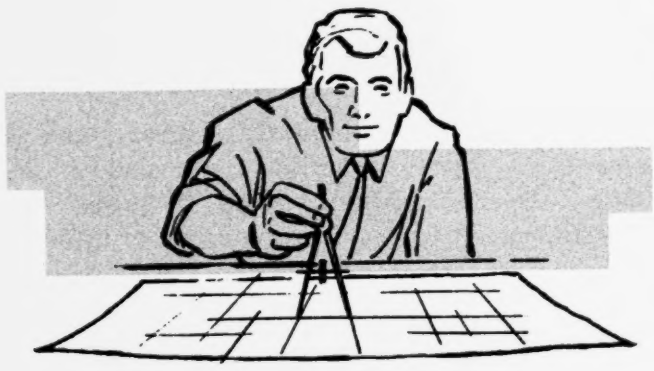
506.3a When the plans and specifications have been reviewed and approval has been granted by the State Board of Education, formal hotice will be sent to the architect, county superintendent and the Board of Education advising of the approval.

506.3b One set of the plans and specifications will be retained by the State Department of Education, and the duplicate set, stamped with the State Board of Education's seal of approval, including the official notice of approval signed by the President and Secretary of the State Board, will be forwarded to the secretary of the local board of education. A copy of the official notice of approval signed by the Secretary of the State Board will be forwarded to the architect and the County Superintendent of Schools.

506.3c Approval by the State Board of Education is valid only for the specific project indicated on the application. Every building project requires separate submission and approval of its plans and specifications. Any changes or revisions to the plans and specifications as approved must be submitted for approval in the same manner as the original submission, as such changes or revisions invalidate the original approval.

506.3d Approval of plans and specifications shall be held as in effect for a period of one year only, after the date of such approval. After that period a renewal of the approval must be secured for the work not under contract.

600 DESIGN SPACE REQUIREMENTS



601
INSTRUCTIONAL ROOMS

601.1 Area

601.1a Every instructional room area shall be planned in consideration of the number of pupils to be housed, the program of instruction to be followed, and the educational purposes of the room.

601.1b It is recommended that standard classrooms be planned in accordance with the following table:

TABLE I

Instructional Areas

Grade or Subject		Desirable	Acceptable
Kindergarten		1,200 sq. ft.	900 sq. ft.
Grades	1 to 3	1,000 sq. ft.	800 sq. ft.
	4 to 8	900 sq. ft.	700 sq. ft.
	9 to 12	800 sq. ft.	650 sq. ft.

601.1c Space recommendations for other instructional areas are indicated in special bulletins available from the Director of School Planning Service.

602
ROOMS ABOVE OR BELOW GRADE

602.1 When a school building has a basement, the ceiling of which averages 7'6" or more above the finished grade line, such basement shall be considered a story in determining the number of stories in the building.

602.2 The finished floor level of any instructional room or place of assembly shall be such that an occupant of its main floor, using main exits, shall ascend no more than 4'0" to reach the outside grade.

602.3 When an instructional room has windows, the major window wall shall have no exterior obstructing wall within 20 feet of it.

602.4 In no case shall an auditorium, assembly room, gymnasium, cafeteria or any space subject to occupancy by 200 or more persons be so situated that an occupant of its main floor, using main exits, must descend more than 8'0" to reach the outside grade.

603
CEILING HEIGHTS

603.1 Classrooms

The average ceiling height of a classroom or other instructional area shall not be less than 9'6", except that ceiling heights may be lowered to 8'0" for areas devoted to clothing alcoves, storage, or project work space. Hardware designed to support a folding partition may be within 8'0" of the finished floor. Otherwise no part of the ceiling structure shall be less than 8'6" above the finished floor. It is recommended that an additional two inches in height be provided to allow for inadvertent variations in materials or construction which could result in the finished ceiling height not meeting this requirement.

603.2 Cafeteria, Shop, Library, or Music Room

The ceiling height in a cafeteria, shop, library, or music room shall be proportionate to the size of the room and appropriate to its use, but shall not be less than that indicated in the preceding rule.

603.3 Corridors

The ceiling height for corridors shall not be less than 7'6" at any point.

604
CORRIDORS

All instructional rooms and places of assembly shall have doors opening into a corridor except those with direct exterior exits. Corridors shall terminate, at each end, with a direct exit to the exterior or with an exit stairway.

604.1 Primary Corridors

Primary corridors are corridors designed to serve more than three instructional rooms.

604.1a Minimun clear widths in elementary schools, grades kindergarten through eight, shall be:

- 7'0" wall to wall without lockers or wardrobes.
- 8'0" wall to locker face with lockers or wardrobes on one side.
- 9'6" locker face to locker face with lockers or wardrobes on both sides.

604.1b Minimun clear widths, at any point in secondary schools, grade seven through twelve, shall be:

- 7'6" wall to wall without lockers.
- 8'6" wall to locker face with lockers or wardrobes on one side.
- 10'0" locker face to locker face with lockers or wardrobes on both sides.

604.1c Primary corridors may be reduced one foot in width from the above requirements when each room has a direct exit to the outside, and

- The corridor door is recessed so as not to project more than 6" beyond corridor wall, or
- The corridor door swings to a 180° angle against the corridor side of the wall, or
- The corridor door swings into the instructional room.

604.2 Secondary Corridors

604.2a Secondary corridors are defined as branch corridors serving no more than three instructional rooms in a portion of the building designed to preclude the addition of more instructional rooms in the future.

604.2b The corridor width may be reduced as much as 1'6" below the required width of primary corridors.

604.3 Projections

Projections extending into the corridor beyond the face of the corridor wall shall not exceed the following:

604.3a Structural, 9" in depth by 1'6" in width.

604.3b Accumulative structural encroachments, 8".

604.3c Drinking fountains, 9".

604.3d Radiators, fire extinguisher cabinets or other recessed equipment, 6".

604.3e Lockers, fully recessed.

604.4 Termination and Dead End Pockets

Corridors shall terminate at each end with a direct exit to the exterior or with an exit stairway.

604.4a No corridor shall dead-end beyond its exit by more than 10'0", but where a corridor widens to form a lobby, or other space between two exits, its depth shall be no greater than its width.

604.4b Passages off corridors shall not be deeper than the width of that passageway.

604.5 Windowless Classrooms

Corridors around any group of windowless instructional rooms shall be provided with electro-magnetically controlled smoke doors so located as to assure smoke-free exit from such windowless rooms. The electro-magnetic controls shall be integrated with and so devised as to close these doors in the event of fire through the functioning of the automatic fire detection system. The width of these smoke doors shall be sufficient to maintain the required minimum corridor width. In buildings completely protected by an approved automatic sprinkler system, the electro-magnetically controlled corridor doors shall not be required.

604.6 Open Plan Buildings

604.6a An open plan educational building shall include every building or portion of a building not having corridors complying with Section 604 or smokestop partitions.

604.6b An open plan building of noncombustible or fire resistive construction shall not exceed 30,000 square feet in undivided area. A solid wall or smokestop partition shall be provided at intervals not to exceed 300 feet. Such a wall or partition may have smokestop doors therein. Doors shall be of metal, metal covered or other approved type appropriate to the purpose and construction of the walls or partitions, with clear wired glass panels.

604.6c Travel distance from any point in an open plan educational building area to an exit door directly to the outside, to an exterior balcony exit or to an approved protected exit corridor or stairway shall not exceed 100 feet in line of travel.

604.6d Interior finish in unsprinklered open plan buildings shall be class "A" or class "B" throughout except that movable partitions not over 7 feet in height may be class "C".

604.6e Open buildings shall have exits independent from assembly portion.

605
EXITS

605.1 Exit Door Width Unit

605.1a An exit door width unit is defined as an opening 22" wide in the clear. An opening 42" wide may be considered to equal two units. An opening 64" wide may be considered to equal three units.

605.1b The number of exit door width units required shall be computed on the designed capacity or the following bases, whichever is larger:

- Instructional rooms, one unit for every three rooms or fraction thereof on each floor.
- Small instructional areas such as remedial reading room, student activity room, or similar spaces with a capacity of 10-15 pupils, one-sixth unit based on 30 square feet of floor area per pupil. Similar areas with a capacity of 16-30 pupils, one-third unit.
- Auditoriums, one unit for each 100 persons based on 7½ square feet of floor area per person.
- Gymnasiums, multi-purpose rooms, large group instruction areas and lecture rooms, one unit for each 100 persons based on 9 square feet of floor area per person.
- Cafeterias, one unit for each 100 persons based on 10 square feet of floor area per person.

- Libraries, one unit for each 100 persons based on 40 square feet of reading area per person.
- Auditoriums and gymnasiums in frame buildings, one unit for every 300 square feet of floor area.

605.2 Computing Total Number of Exit Units Required

Compute the total number of units of exit width required for the first floor by adding to the number required for that floor the number required for the second floor, plus one-half the number required for the third floor, plus the total number required for any basement or below grade rooms occupied by pupils. (See Section 607.2 on **Stairways**)

605.3 Exit

605.3a An exit is defined as a doorway or doorways, interior or exterior, providing safe access directly to corridor and the exterior with safe access to the street.

605.3b Exits as remote from each other as practicable shall be provided on the following basis:

- Rooms or spaces of 2000 or more square feet or a capacity of from 100 to 600 persons — at least 2 exits.
- Rooms or spaces with a capacity of from 600 to 1000 persons, at least 3 exits.
- Rooms or spaces, with a capacity of more than 1000 persons, at least 4 exits.
- In determining the number of exits required, capacities of rooms or spaces shall be computed in accordance with 605.1 above.
- Required exits may use communicating corridors leading to exterior exits, but, emerging from any one room or space with a capacity of 200 or more persons, they shall not use a common stairway.
- Instructional rooms having a capacity of 15 or more and providing 300 or more square feet of space having direct entrance only through a space other than a corridor, such as an assembly room, stage, gymnasiums, cafeteria, all-purpose room, or room of similar function, shall be provided with an exterior exit door.

605.4 Distance to Exits

605.4a At least one available stairway or exit shall be within 120 feet as measured along the center line of the corridor from the center line of the door from each instructional room, locker room, or room with a capacity of 15 or more pupils.

605.4b Each exit door from places of assembly shall be within 120 feet of an available exterior exit or stairway with a capacity at least equal to the exit units from the place of assembly.

605.5 Heater Rooms

Heater rooms, having any type of combustion equipment, with an area of 100 square feet or more shall have two exits remote from each other. One shall be to the exterior of the building. A heater room with an area of 100 sq. ft. or less shall be required to have an exit to the exterior.

605.6 Windowless Classrooms

A secondary means of exit from each room shall be available in addition to the regular corridor exit. This may be via an adjoining instructional area to a second corridor, directly to such second corridor, or into an adjoining instructional area provided with not less than one emergency exit door or window as set forth on Par. 1103.2b. Locks on doors leading to a secondary exit shall not be permitted. Such doors shall be lettered: "Emergency Exit Door — No Locks Permitted".

605.7 Step at Exterior Entrance or Exit

There shall be no step within four feet of the doorsill of any exterior entrance or exit.

605.8 Auditorium Seating

The layout of seating for auditoriums shall be in accordance with NFPA Standard No. 101, Section 8-127, latest edition.

605.9 Interior Courts

All interior courts up to 2,000 square feet in area shall have not less than one exit. Closed courts with an area between 2,000 and 5,000 square feet shall have not less than two exits, one of which shall open onto a corridor or to the exterior. Closed courts with an area between 5,000 and 7,500 square feet shall have at least three separate exits, one of which shall open onto a corridor or to the exterior. All courts of over 7,500 square feet shall have four exits, two of which shall open onto a corridor or to the exterior. Exits to the corridor shall have widths of not less than two exit units. Interior closed courts shall have exit facilities operable from the court side at all times that the building is occupied. The exit doors shall swing into the corridor.

605.10 Divisible Auditoriums

Auditoriums, assembly rooms, or other spaces when equipped with folding partitions shall be as follows:

- Each individually enclosed area shall have at least one unit of exit for each one hundred persons or fraction thereof.
- There shall be provided from each enclosed area with a capacity of 100 or more at least two separate exits as remote from each other as practicable, one of which shall open onto an exit corridor or to the exterior.
- Each door or exit from the enclosed space shall provide an unobstructed passage to a corridor or to the exterior.

- The individually enclosed space shall be designed to meet all requirements for windowless classrooms.

606.
DOORS

606.1 Width

All doors falling within the following categories shall not be less than 2'6" wide in their clear opening:

- Exterior exit doors.
- Doors from instructional rooms to the corridor.
- Smoke screen doors.

606.2 Hardware

606.2a All pupil exit doors from the building, including exit doors from auditoriums, gymnasiums, all-purpose rooms, cafeterias, and two or more classrooms using a common door, shall be equipped with bar-type panic hardware, except that in lieu thereof doors to the exterior from heater rooms, shops, locker rooms, and other special instructional areas may be of the knob operated type always permitting egress.

606.2b All pupil interior exits from auditoriums, gymnasiums, all-purpose rooms, cafeterias, and spaces housing a capacity of 200 or more persons shall not be capable of being locked unless hardware of the panic type is used.

606.2c Locks on all doors used by pupils, except where panic hardware is required, shall be the knob-operated type only, permitting egress from the room at any time.

606.2d All exterior exit doors, the interior doors to pupil toilet and locker rooms, and fire or smoke screen doors shall be equipped with approved self-closing devices. Individual classroom exit doors are exempted from this requirement.

606.2e Hold-back devices of any type are not permitted on fire or smoke screen doors, except in corridors serving windowless classrooms where corridors shall be equipped with self-closing electro-magnetically controlled smoke doors integrated with the automatic fire detection and alarm system of the building.

606.2f Corridor doors when glazed shall have an opening not to exceed 2'0" x 3'6" high of ¼ inch wire plate glass.

606.3 Swing of Doors

606.3a Doors from instructional rooms shall swing into the corridor unless the rooms are also provided with an exit door leading directly to the outside, when the swing of the corridor door shall be optional.

606.3b Doors shall not be so located as to offer an obstruction to, or to block, when opened, the maximum free opening of doors from rooms, stairways, or exits.

606.3c Smoke screen doors and all pupil exit doors shall swing outward.

606.4 Types of Doors

606.4a Smoke screen doors shall be solid-core veneered, kalamein or hollow metal 1¾" thick. Such doors shall have panels of clear plate wire glass designed to prevent collisions between persons passing in opposite directions.

606.4b Doors for the following spaces shall be "B" label fire doors:

- Stage
- Fan Room
- Mechanical and main electrical equipment rooms.
- Head of basement stairs
- Openings to permanent stairs to attics and roofs
- Heater rooms. The doors shall be hinged and swing into the heater room.

606.5 Lettering on Fire and Smoke Screen Doors

All fire and smoke screen doors, except electro-magnetically controlled doors, shall be clearly lettered "Fire Door" or "Smoke Door — Keep Closed."

606.6 Exterior Entrance and Exit Doors

Exterior entrance and exit doors shall contain panels of clear glass, except emergency exit doors from places of assembly. The glass panel above the lock rail shall be not less than 3/16" thick. Any glass below the lock rail or directly behind panic bars shall be clear plate wire glass or tempered glass.

607
STAIRWAYS

607.1 Stairway Widths

607.1a A unit of stairway width shall be 22" clear. The width of a stairway shall be determined to be the clear distance between handrails.

607.1b A stair with a clear width of 42" may be considered to equal two units; a stair with a clear width of 64" may be considered to equal three units; and a stair with a clear width of 84 inches may be considered equal to four units.

607.1c The minimum width for an exit stairway shall be 42" clear between handrails.

607.1d One unit of stairway exit shall be provided for every three classrooms, every three instructional

areas, or for every 100 occupants or fraction thereof for any story above the first floor.

607.2 Number of Stairways Required

607.2a A minimum of two stairways remote from each other shall be provided for a building with not more than 12 classrooms or 400 occupants above the first floor.

607.2b No stair shall provide more than four units of stairway width.

607.2c When four unit stairs are used, not less than three enclosed separate stairways shall be provided. Four unit stairs shall be counted as two enclosed stairways.

607.2d The number of units of stair width required for any floor above the first floor shall be equal to those computed for that floor plus the total number computed for the first floor above that floor, plus one-half of the number of units required for the second floor above the floor in question.

See following example and Section 605.2 for exit units.

TABLE II

Method for computing exit and stairwidth requirements

Occupancy per Floor	Number of Floors	Exit Units per Floor	Stairwidth Units per Floor
12 Classrooms	Sixth	4	4
12 Classrooms	Fifth	4	4 plus 4 from 6th floor for a total of 8
12 Classrooms	Fourth	4	4 plus 4 from the 5th floor plus ½ of 4 from 6th for a total of 10
12 Classrooms	Third	4	4 plus 4 from the 4th floor plus ½ of 4 from 5th for a total of 10
12 Classrooms	Second	4	4 plus 4 from the 3rd floor plus ½ of 4 from 4th for a total of 10
Gym-Cap. of 300 Aud. Cap of 600 Other Cap. 200 Total Cap. 1,100	First	Exit units required from 1st floor equal 11 plus 4 from 2nd floor plus ½ of 4 from 3rd floor for a total of 17. (See Section 605.2 for exit units) If there is a basement subject to pupil occupancy, the required number of exit units for that occupancy should be added to the above total.	

607.2e The number of units of stair width required for any floor shall not be less than that required for any floor above that floor.

607.3 Design of Stairways

607.3a No stair run shall exceed 15 risers of uniform height.

607.3b Risers shall not exceed seven inches in height.

607.3c Treads shall have a minimum width of 11 inches including nosing which shall not exceed a one-inch projection.

607.3d Treads shall have a flush non-slip surface of not less than three inches. The top tread on each run shall have a flush non-slip surface extending not less than 12 inches from the riser.

607.3e Treads at the top, bottom, and intermediate landings shall be flush with adjacent surfaces.

607.3f Stairways shall continue with no decrease in width along the direction of exit travel.

607.3g Winders will not be permitted on any stair used for exit purposes.

607.3h The distance from the first riser to the smoke-screen door shall no be less than twice the width of the smoke-screen door.

607.3i Handrails shall be provided upon both sides of the stairs. Inside handrails shall be continuous from the top of the stairs to the bottom. Balustrades at sides and top of stairs shall not be less than four feet high. Balusters shall be no more than 8 inches apart.

607.3j When the width of a flight of stairs exceeds 84 inches and has more than three risers, an intermediate handrail, continuous between landings and securely supported, with no projections, shall be provided.

607.3k Unless otherwise provided for as in 607.3L below, the open space at the center line of intermediate newels shall not exceed six inches between stringers, balustrades, or the equivalent.

607.3L Enclosed stairways at first or ground floor level may be modified to permit the distance between handrails or balustrades on successive runs of stairs or between separate stairways to exceed six inches provided that the stair tower or enclosure is protected by an acceptable sprinkler system.

607.3m Windows in enclosed stairways, when sill heights are less than 36" above the floor landing, shall be protected by railings or other devices for the safety of children.

607.3n Each exit stairway shall terminate in a direct exterior exit with sufficent exit units to equal or exceed the capacity of the stairway.

607.4 Enclosed Stairways

607.4a All stairways shall be enclosed and equipped with smoke screen doors.

607.4b All stairways and enclosing walls shall be built of non-combustible materials sufficient to provide not less than one-hour fire rating. In buildings of more than two stories the doors also shall have a one-hour rating.

607.4c All glazing in enclosed stairways shall be of wire glass, except exterior windows.

607.4d It is recommended that all stairways have natural illumination. They shall comply with the emergency lighting requirements. (See Section 1209)

607.4e Storage spaces, closets, or other rooms under an enclosed stair are not permitted.

607.4f No interior doors or openings except from corridors and places of assembly shall be permitted in enclosed stairways.

607.5 Location of Stairways

607.5a At least one available stairway or exit shall be within 120 feet as measured along the center line of the corridor from the center line of the instruction or assembly room exit doors to the center line of the exit or stairway doors.

607.5b Stairways shall be so located with respect to corridors, passages, and other rooms that no corridor shall dead-end beyond the entrance to the stairs more than ten feet. Where a corridor widens to form a lobby, or other space between two exits, its depth shall be no greater than its width.

607.6 Convenience Stairs

Convenience stairs for pupil use shall not be accessible from corridors except through doors swinging into the corridor and equipped with door closers. They shall comply with all requirements for exit stairways except as follows:

- Direct exit to the exterior will not be required.
- Space under stairs may be used for purposes other than closed-in storage space or closets.
- Openings in addition to those from corridors shall be permitted.
- Open stairs intended for access to mezzanine storage areas such as in industrial arts rooms

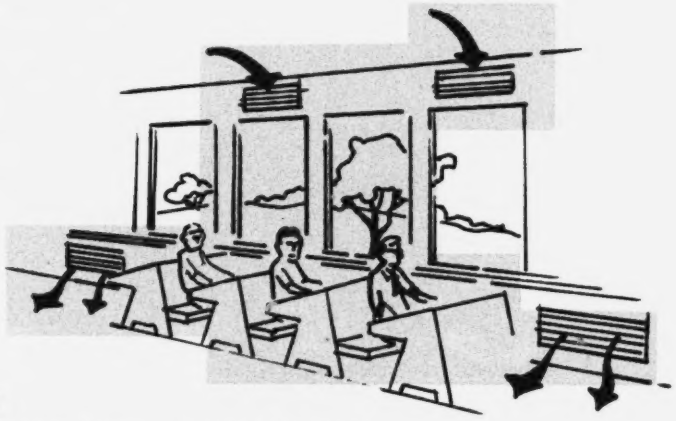
shall be permitted and may be any appropriate width but never less than 30 inches from balustrade to balustrade, or wall to wall, and their risers may be a maximum of 8 inches and their treads a minimum of 9 inches between riser faces.

607.7 Ramps

607.7a No ramp for pupil use, including auditorium floors, shall exceed a one-foot rise for each ten feet of run.

607.7b Ramps shall have non-slip finish.

700 VENTILATION



701 MECHANICAL AIR SUPPLY

All school buildings shall be equipped with a mechanical air supply ventilation system which will provide, during periods of occupancy, standard air at the rates set forth in Table III.

701.1 Exhaust Relief

Provision shall be made for the exhaust or relief of the above quantities of outdoor air, in excess of one air change per hour, except odor or fume producing rooms such as Finishing Rooms, Laboratories, Kitchens, Home Economics Rooms, Locker Rooms, Toilets, etc., which shall have exhaust equal to 110% of supply requirements.

The above quantities are minimums. The architect and engineer are cautioned to study each individual problem, making proper allowances for type of occupancy, smoking, heat and vapor generation, etc., in determining the amounts of fresh air to be provided for each space.

701.2 Lockers

Ventilation shall be provided for all corridor lockers.

TABLE III

Air Supply and Exhaust Requirements Based Upon CFM/Square Foot of Floor Area

Room Name	Supply	General Exh.	Summer Exh.	Air Conditioned Supply	Air Conditioned Exhaust
Auditorium and Lecture Halls	1.35	1.35	2.70	1.00	1.00
Gymnasium	1.00	1.00	3.00	.83	.83
All-Purpose Room	1.00	1.00	3.00	.83	.83
Cafeteria	1.40	1 50		.68	.75
Class Rooms	.50	.50		.50	.50
Shops	.50	.50		.30	.30
Chemistry Biology and General Science Labs.	.50	.55		.30	.33
Electrical and Physics Labs	.35	.35		.30	.30
Cooking Rooms	.68	.75		.45	.50
Offices, Teachers, Conference, and Seminar Rooms	1.00	1.00		.50	.50
Music Rooms	1.00	1.00		.50	.50
Kitchen	(A) 3.00	3.30		(A) 1.80	2.00
Toilets (General)	(A) 1.50	1.65		(A) 1.50	1.65
Locker and Shower Rooms	(A) 1.50	1.65		(A) 1.50	1.65
Toilets (Private) 100 cfm. min. exh.	(A) 1.50	1.65		(A) 1.50	1.65
Janitors' Closet 100 cfm min. exh.	(A) 1.50	1.65		(A) 1.50	1.65

(A) May be drawn from adjacent areas i.e.—corridor, cafeteria or gym.

702
AIR EXHAUST

702.1 Instructional Rooms

All classrooms and other instructional area shall be provided with exhaust ventilation. Such ventilation shall be through clothing storage areas, lockers, or individual room vents, but in no case shall the exhaust ventilation be direct to or from the corridor.

702.2 Shops and Laboratories

Mechanical power exhaust ventilation shall be provided in all shops, laboratories, toilet, locker and shower, cooking, and science preparation rooms in which dust, gases, fumes, or odors might be produced in sufficient quantity to be deemed harmful to the health and well-being of occupants.

702.3 Noxious Gases

A built-in mechanical exhaust system shall be provided for each internal combustion engine, heat-treating furnaces, and spray-painting booth.

702.4 Fume Hoods

Laboratories and shops with fume hoods or special supplemental exhaust equipment shall be provided with automatic means for introduction of tempered make-up air. The quantity of this air should be 10% less than the exhaust air.

703
STORAGE OF INTERNAL COMBUSTION ENGINES

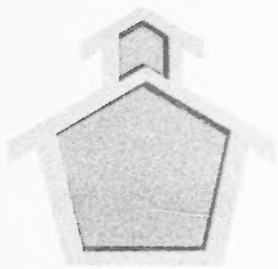
There shall be exterior exhaust ventilation to eliminate possible accumulation of gases or vapors where internal combustion engines might be operated within the school.

704
RECIRCULATED AIR

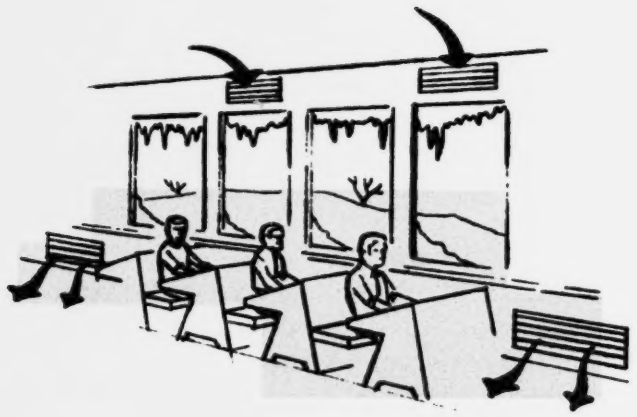
Recirculation of air is permitted, except from shops, laboratories, kitchens, provided that the minimum quantity of outdoor air, as previously specified, is furnished.

705
WINDOWLESS CLASSROOM VENTILATION

All windowless instructional rooms shall be provided with individual, automatic temperature controls and a heating-cooling and ventilating systems so designed as to maintain the temperature at not more than 80 degrees Fahrenheit during the heating season and temperature and air changes in accordance with the performance requirements set forth in the section of the **Guide** pertaining to air conditioning in public schools. While recommended, air conditioning is not required in auditoriums, gymnasiums, and cafeterias.



800 HEATING



801
HEATING PLANT CAPACITIES AND WEATHER ZONES

School heating plants shall be of sufficient capacity to heat all parts of the building occupied by pupils to a uniform temperature of 70°F in zero weather in the North Zone of New Jersey and in plus 10°F in the South Zone of New Jersey. The 40th parallel shall be the line of demarcation between the north and south zone.

802
TEMPERATURE CONTROL

802.1 Pupil Occupied Areas

An automatic control system shall be provided which will assure a relatively uniform temperature in all areas occupied by pupils.

802.2 Zoning Permitted

Automatic temperature control may be provided either with individual room thermostats or with thermostats located in zones throughout the buildings.

802.3 Zoning Related to Building Use

Zoning of certain parts of building such as the gymnasium, administrative offices, library, or auditorium, to permit heating the same independent of the rest of the building, is recommended.

803
HEATER ROOM

803.1 Air Intake

Heater rooms having any type of combustion equipment shall be provided with an outside air intake with a net free area equivalent to 75 per cent of the smoke stack gross section area for the purpose of proper combustion of fuel.

803.2 Explosion Release

All heater rooms shall be provided with an exterior window or skylight of suitable proportions to serve as a release in the event of an explosion.

804
HEATING PLANT SAFETY

804.1 Safety Devices

All coal, liquid fuel, or gas fired boilers and vessels or furnaces used for heating or for domestic hot water shall be provided with all prescribed safety devices recommended by National Fire Protection Association Standard No. 89M, latest edition.

804.2 Bottled Gas

Where bottled gas is used for any purpose, the location of containers shall be in accordance with the latest published standards of the National Fire Protection Association, Standard No. 58, for the storage and handling of liquefied petroleum gas.

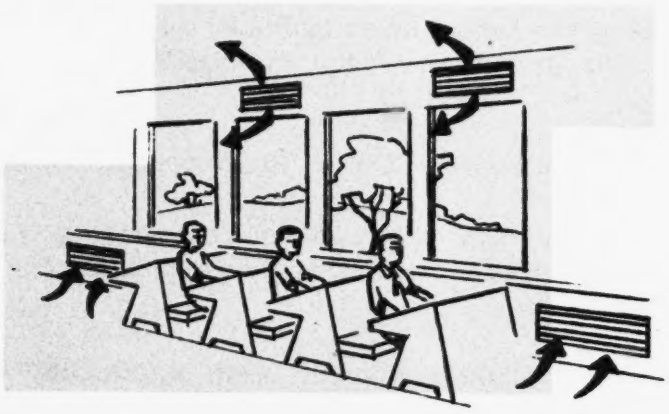
804.3 Emergency Switches

Not less than two emergency cut-off switches for all heating furnaces shall be provided, clearly lettered and conveniently located, one at or near each exit doorway.

804.4 Gas Pilot Lines

All gas pilot lines shall be provided with solenoid vapor valves.

900 AIR CONDITIONING



901
PURPOSE

The intention of the Department is to establish regulations conducive to the safety of the occupants of public educational buildings having air conditioned spaces and to the maintenance of a satisfactory ambient air environment in such structures.

Nothing in the following shall be construed as prohibiting the use of gas fired or electrically driven refrigerating equipment for other than treatment of air to be delivered to classrooms, or for precluding the use of small or model selfcontained units in shops or laboratories for instructional purpose in the study of such devices.

902
REFERENCES

All equipment and method of installation must conform to the requirements of the following:

902.1 STANDARD NO. 90A of the National Fire Protection Association entitled "Installation of Air Conditioning and Ventilating Systems" (Non-Residential).

902.2 SAFETY CODE FOR MECHANICAL REFRIGERATION (American Standards Association No. ASA B9.1 or ASHRAE Standard 15-64, which are identical)

902.3 NATIONAL ELECTRICAL CODE. (Standard No. 70 of the National Fire Protection Association.)

902.4 All devices shall conform to applicable underwriters' codes, including N.F.P.A. No. 70.

903
PERFORMANCE REQUIREMENTS

903.1 Ambient Air Condition

The air conditioning system including all of its equipment and controls shall be designed to effect an ambient air condition no higher than 80° with a relative humidity not exceeding 50% when the exterior air is 95° F dry bulb and 78° F wet bulb.

903.2 Air Changes

The minimum amount of outdoor air for ventilation shall be equal to one air change per hour plus exhaust requirements of equipment, hoods, appliances, toilets, etc., *or* as per Table III, Section 701; whichever is greater.

903.3 Extent of Air Conditioning Required

Nothing in the preceding shall be construed to mean that all rooms or any spaces of public educational buildings shall be air conditioned. But if any room or space is air conditioned, then that space, or any spaces so treated, must comply with the stipulations of Table III, Section 701.

904
SUBMISSION

The designer shall certify that his submission complies in all respects with the provision of this division of the **Guide.**

905
DEFINITIONS

905.1 Refrigerant

Refrigerant is a substance used to produce refrigeration by its expansion or vaporization.

905.2 Refrigerating System

Refrigerating system is a combination of interconnected refrigerant-containing parts constituting one closed circuit.

905.3 Unit System

Unit system is a self-contained system which has been assembled and tested prior to its installation and which is installed without connecting any refrigerant-containing parts.

905.4 Direct System

Direct system is one in which the evaporator is located in air-circulating passages.

905.5 Indirect System

Indirect system is one in which a liquid, such as water, cooled by the refrigerant, is circulated through air circulating passages.

905.6 Evaporator Coils

Evaporator coils are that part of a system in which liquid refrigerant is vaporized.

906
RESTRICTIONS

906.1 As to Location

No direct refrigerating system shall be installed in or on a stairway, landing, entrance, or exit.

906.2 Passageways

No refrigerating system shall interfere with free passage.

906.3 Refrigerant Quantities

Direct systems shall be limited to the quantities of refrigerant specified herein.

906.4 Direct Systems

Direct systems installed in hallways or lobbies are limited to Unit Systems, or factory pre-charged systems having no more than ½ the refrigerant quantities specified hereinafter under "Direct System Refrigerants".

906.5 Gas Fired Units

Self-contained, gas-fired units are prohibited in any room used for pupils and staff.

907
REFRIGERANT PIPING THROUGH FLOORS

Refrigerant piping shall not be carried through floors except as follows:

907.1 Floor to Floor Limitations

It may be carried from the basement to the first floor or from the top floor to a machinery penthouse, or to the roof.

907.2 In Vented Pipe Shaft

It may also be carried through intermediate floors between the first floor and the top floor, provided it is enclosed in a rigid and tight continuous fire-resistant pipe shaft where it passes through spaces not served by the system. This shaft shall be vented to the outside or to a space served by the system.

908
DIRECT SYSTEM REFRIGERANTS

908.1 Maximum Quantity Refrigerant Permitted

The maximum permissible quantity of refrigerant in each direct system per 1000 cubic feet of humanly occupied space shall be as follows:

Refrigerant 12	31 lbs.
Refrigerant 22	22 lbs.

For other refrigerant quantities see Reference 902.2

908.2 Type of Refrigerant Approved

Only Group 1 Refrigerants will be permitted.

908.3 Computing Permissible Quantities of Refrigerant

When the refrigerant containing parts of a system are located in one or more enclosed spaces, the cubical content of the smallest enclosed humanly occupied space other than the machinery room shall be used.

When the evaporator is located in an air duct system, the cubical content of the smallest humanly occupied enclosed space served by the air duct system shall be used to determine the permissible quantity of refrigerant in the system. However, if the air flow to any enclosed space served by the air duct system cannot be shut off or reduced below one-quarter of its maximum, by the occupants during the normal operation of the system, the cubical contents of the entire space served by the air duct system may be used to determine the permissible quantity of refrigerant in the system.

908.4 Evaporator Coils, Proximity to Heating Coils

System having evaporator coils located within 18 inches of heating coils shall comply with either of the following:

908.4a Fit the evaporator with a pressure-relief device set at 400 psi and discharging outside the building in an approved manner.

908.4b Limit surface temperature of heating coil to max. of 500° F, under normal conditions of service.

908.5 Where Direct Systems May Not Be Used

Direct systems shall not be used for rooms containing equipment which produces open flames, unless such equipment is provided with a hood and flue capable of removing products of combustion to the open air. This restriction does not apply to bunsen burners or small portable laboratory equipment.

909
INDIRECT REFRIGERANT SYSTEMS

Systems containing more than the quantities of refrigerant allowed above shall be of the indirect type with all refrigerant-containing parts, except parts mounted outside the building and piping installed as above, placed in a machinery room used for no other purpose than for mechanical equipment.

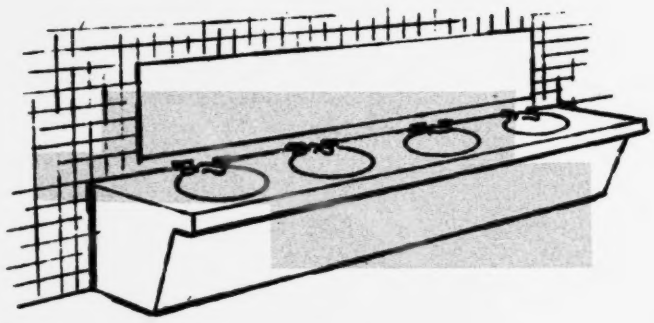
910
VENTILATION FOR MECHANICAL EQUIPMENT ROOMS

The ventilation shall consist of windows or doors opening to outdoors. Or it may be provided by mechanical exhaust. For each 100 lbs. of refrigerant, the window or door opening shall be at least 10 sq. feet, or the mechanical exhaust shall be at least 400 CFM. The mechanical exhaust fan shall be operated whenever the building is occupied and the system fan is running.

These quantities shall be determined by the refrigerant content of the largest system in the machinery room.

Provision should be made for the inlet of air to replace that being exhausted.

1000 SANITATION



1001
PLUMBING CODES AND REGULATIONS

1001.1 Plumbing Code of New Jersey

All plumbing installation shall conform to the standards of the latest published Plumbing Code of New Jersey (Part E of the Standard Building Code of New Jersey) and subsequent amendments theretc, except wherein the same is in conflict with any regulations of the State Board of Education. (This shall be clearly indicated on the plans).

1001.2 Approval of Sewage Disposal System

Where connection to an approved sewer cannot be effected, plans and specifications for septic tanks, drainage fields, and sewage treatment plants shall be in accordance with the latest published rules and regulations of and approved by the New Jersey State Department of Health. (Its letter of approval shall accompany each set of plans).

1001.3 Approval of Water Supply

Where an approved public water supply is not available, provisions for drinking water shall be made in accordance with the latest published rules and regulations as prescribed by the New Jersey Department of Health.

1001.4 Water Pump

Any water pump capable of diverting more than 100,000 gallons of water per day for any purpose shall comply with N.J.S.A. 58:4A-1.

1002
TOILET FACILITIES

1002.1 General Toilet Rooms

No general pupil toilet room shall contain less than two of each of the respective fixtures required.

1002.2 Kindergarten Toilets

Kindergarten rooms shall be equipped with separate water closet and lavatory facilities.

1002.3 Natural Light

The providing of natural light in toilet rooms shall be optional.

1002.4 Screening

Entrance to toilet rooms and locker rooms shall be screened to prevent visibility into the room.

1002.5 Stall Partitions

Water closets shall be separated by individual stall partitions of a smooth impervious material to permit effective cleaning. Providing stall doors is optional. Partitions need not extend to the floor.

1002.6 In Basements

No pupil toilets, except auxiliary toilets, shall be located in building basements.

1002.7 In Multi Story Buildings

In multi-story buildings there shall be toilet rooms for boys and girls on each floor.

1002.8 Number of Fixtures Required

The following ratio of sanitary fixtures based on 30 pupils per classroom shall be considered minimum requirements in school buildings. Where school buildings have self-contained classrooms with toilet and lavatory facilities, the pupils in these rooms shall not be counted in computing the number of fixtures to be installed in general toilet rooms.

1002.8a Water closets

Girls-Grades one through eight	One to 30 pupils
Boys-Grades one through eight	One to 60 pupils
Girls-Grades seven through twelve	One to 45 pupils
Boys-Grades seven through twelve	One to 90 pupils

1002.8b Urinals

Boys-Grades one through eight	One to 30 pupils
Boys-Grades seven through twelve	One to 45 pupils

1002.8c Lavatories

Boys and Girls-All Grades	One to 50 pupils

1002.9 Wash Fountains

Wash fountains in lieu of separate lavatories will be computed on the basis of the following ratios:

One 54" circular wash fountain equals 8 lavatories

One 36" circular wash fountain equals 5 lavatories

One 54" semi-circular wash fountain equals 4 lavatories

One 36" semi-circular wash fountain equals 3 lavatories

One 27" semi-circular wash fountain equals 2 lavatories.

1002.10 Flushometer Valves

When flushometer valves are used, they shall be provided with approved vacuum breakers.

1002.11 Hot Water Temperature Control

The temperature of domestic hot water shall be thermostatically controlled. The temperature of hot water going to shower heads shall be thermostatically controlled by a central mixing valve or valves so located as to be easily supervised.

1003
DRINKING FOUNTAINS

1003.1 Number Required

The number of drinking fountains to be installed in a school building shall be in accordance with the following ratios:

1003.1a Elementary Schools

One drinking fountain for each 50 pupils up to 250 pupils plus

One drinking fountain for each additional 75 pupils up to 550 pupils plus

One drinking fountain for each additional 100 pupils or fraction thereof beyond 550 pupils.

1003.1b Secondary Schools

One drinking fountain for each 75 students up to 300 students plus

One drinking fountain for each 125 students up to 550 students plus

One drinking fountain for each 200 students or fraction thereof beyond 550 students.

1003.1c When drinking fountains are installed in instructional rooms, the pupil capacity of these rooms shall not be used in computing the total building capacity to determine the number of drinking fountains required elsewhere.

1003.2 Minimum Number Fountains per Building

At least two drinking fountains shall be provided in every school building, one of which is available for public use.

1003.3 Minimum Number Fountains per Floor

There shall be not less than one drinking fountain on each floor of multi-story buildings.

1003.4 Type of Fountain

Drinking fountains shall be of the angle-stream type.

1003.5 Required in Kindergarten Room

Drinking fountains shall be provided in kindergarten rooms.

1003.6 Not Permitted in Toilet Rooms

Drinking fountains or bubblers shall not be installed in toilet rooms.

1003.7 Fountains Attached to Sinks or Lavatories

Angle-stream fountains may be attached to sinks or lavatories in instructional rooms.

1003.8 Heights of Drinking Fountains

Recommended heights for nozzles of drinking fountains are: Kindergarten and primary grades, 24 inches; upper elementary grades, 28 inches; junior high school, 32 inches; and senior high school 36 inches.

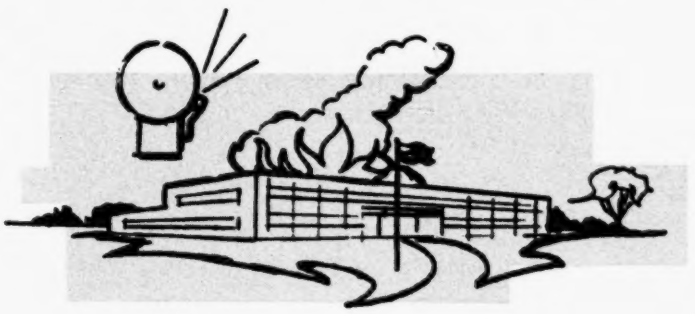
1004
CUSTODIANS' CLOSETS

Custodians' service rooms with sinks and adequate storage space shall be provided, with a minimum of one such facility for each story, located to provide the greatest accessibility to the areas served. (For Ventilation, see Section 701)

1005
TOILET AND SHOWER ROOM FLOORS

Toilet and shower room floors shall be of ceramic tile or equally impervious materials.

1100 SCHOOL PLANT SAFETY



1101 FIRE SAFETY

1101.1 Frame Construction

This is defined by subsection-"a-1" of section 18A: 24-5 of the **New Jersey Statutes Annotated** as follows:

This is a building or structure of which the structural members, exterior walls, or a portion thereof, are constructed of wood, or other combustible material, or a building sheathed with combustible material and partially or entirely covered with 4 inches or less of masonry or other noncombustible material.

1101.1a As hereinafter amplified, frame construction may be used for one-story school buildings, without basement or room below grade, provided that each classroom shall have an outside exit and that no other frame structure shall be located closer than 100 feet to any part of such frame school building. Space necessary for the heating plant may be located in a room below grade if such room meets requirements for non-fireproof construction. (See section 1101.2a below.) No room shall contain more than 2,500 square feet.

1101.2 Noncombustible Construction

This is defined by subsection "a-2" of section 18A:24-5 of the **New Jersey Statutes Annotated** as follows: This is a building or structure of which the outer walls, columns, piers, beams, lintels, girders, and interior-bearing partitions are of noncombustible materials (laminated wood beams, columns or trusses of not less than 6" x 10" nominal dimensions shall be permitted).

1101.2a. Noncombustible construction, as thus defined and as hereinafter amplified, may be used for all one-story and two-story school buildings, provided that stair halls, heater rooms, and coal vaults are of noncombustible construction with a one-hour rating for floors, walls, and ceilings. Corridor walls, floors, and ceilings shall be constructed of noncombustible materials. All glass panels in corridors shall be of wire glass, except in display cases which are completely enclosed by noncombustible construction. Interior corridors shall be provided and the floor, walls, and ceiling shall be constructed of noncombustible materials, unless all instructional rooms and places of assembly have direct exits to the outside.

1101.3 Fire Resistive Construction

This is defined by subsection "a-3" of section 18A:24-5 of the **New Jersey Statutes Annotated** as follows: This is a building or structure of which all structural members, including walls, partitions, columns, piers, beams, lintels, girders, trusses, and floors are of noncombustible materials, and in which the floors, stair towers, and all places of assembly are built entirely of noncombustible materials, and in which no woodwork, supporting material, or other combustible material is used in any of the partitions, floorings, or ceilings; but this definition shall include a building in which there is used, elsewhere than in the stair towers and corridors, wooden floorings and sleepers laid directly on top of a fire resistive floor, or having wooden doors, window sash, wooden jambs, frame casing or trim in other than stair towers, corridors and exit passages, or wooden rafters.

1101.3a Fire resistive construction, as hereinafter amplified, may be used for all school buildings and shall be used for all those which are three-stories and over in height. Floors, walls, and ceilings in corridors, stair towers, and heater rooms shall have a one-hour rating. Roofs, except over stages equipped to fly scenery and boiler rooms, may be of noncombustible construction.

1101.4 Corridor Doors

Corridor doors, when glazed shall have an opening not to exceed 2'0" wide by 3'6" high of wire plate glass.

1101.5 Built in Fixtures

Stage framing, music room and science room platform risers, when built-in, shall be of noncombustible construction.

1101.6 Folding Partitions

Folding partitions shall be designed to provide a ¾ hour fire rating with exterior surfaces having a flame spread rating of not more than 25.

1101.7 Corridor Lockers

Corridor lockers shall be of noncombustible construction.

1101.8 Permanent Stages

All auditoriums with permanent stages equipped to fly scenery shall conform to the requirements of the NFPA Standard 101, Section 8-151.

1101.9 Oil and Gas Installations

Fuel oil or gas burner installations, including fuel storage and fuel supply lines, shall comply with the latest published standards established by the National Fire Protection Association.

1101.10 Corridor Obstructions

Corridors shall be free of all obstructions except as noted elsewhere in this **Guide.** (See Sections 604.3 — 604.3e) Corridor lockers, display cabinets,

and other cabinets shall be constructed of noncombustible material.

1101.11 Incinerators and Trash Chutes

Incinerators, when installed, shall be in the furnace or heater room, or in other similar rooms and trash chutes shall end in such rooms. Incinerator and trash rooms shall be in accordance with the National Fire Protection Association Standard No. 82, as amended. Incinerators shall be designed in accordance with the latest regulations of the New Jersey State Department of Health. Open burning of waste material is not permitted.

1101.12 Boiler and Electrical Equipment Rooms

1101.12a Boiler rooms, main electrical service equipment rooms, and rooms which house flame-operated equipment or incinerators shall be enclosed by noncombustible floor, walls, and ceilings designed to provide not less than a one-hour fire rating. Mechanical equipment rooms, fan rooms, and electrical equipment rooms shall be enclosed by noncombustible floors, walls, and ceilings.

1101.12b Existing boiler rooms, existing electrical service equipment rooms, and existing rooms which house flame-operated equipment or incinerators, shall be upgraded to comply with all present regulations when new equipment is installed or the method of firing such equipment is modified or changed or the equipment is enlarged.

1101.13 Housing Gasoline Powered Equipment

Powered grounds equipment, automobiles, and other internal combustion type engines when housed within a school building, shall be in rooms the floors, walls and ceilings of which have a fire resistance rating of not less than one hour. When an interior door is provided, it shall be a class "B" hinge-type fire door equipped with approved self-closing hardware and a sill height of 18" in accordance with the requirements outlined by N.F.P.A. Standard No. 70, as amended. Such doors shall be lettered "Fire Door — Keep Closed."

Equipment powered by internal combustion type engines may also be housed in a separate building of noncombustible construction. A wood roof shall be permitted provided the ceiling has a one-hour resistance rating. A building of combustible construction shall also be permitted provided that no such structure shall be located closer than 100 feet to any pupil occupied building.

1101.14 Air Ducts Penetrating Walls of Heater Rooms

Where air ducts or pipes penetrate heater room walls, the construction around the pipes or ducts shall be such as to prevent fire or smoke spread through or around the openings. At points where heating and ventilating ducts or flues penetrate heater room walls, or ceilings, they shall be equipped with heat-actuated noncombustible fire dampers.

1101.15 Flammable and Combustible Liquid Storage

The storage of gasoline or any flammable and combustible liquid with a flash point below 200° F shall be in accordance with NFPA Standard #30 except liquified petroleum gas.

1102.
FIRE ESCAPES (Where they are found necessary)

1102.1 Construction of

Fire escapes shall be constructed of metal stringers, treads, and platforms, with a rise of not more than seven inches in height and treads not less than 10-½ inches in width, projecting not more than one inch over the tread below. Treads and platforms shall have gratings of the reticulated or rectangular mesh type with bearing bars not more than ¾ inch on centers, and crossbars not more than four inches on centers.

1102.2 Entrance Platform

Entrance platforms shall be not more than five inches below the adjoining floor. Entrance to the platform shall be by means of a door,extending to the floor level. Platforms shall not be less than the width of the masonry opening of the doors which they serve.

1102.3 Stairs

The stairs shall be not less than 3'2" wide between handrails, supported by vertical steel members or concrete filled circular columns. Stairs shall extend uninterrupted to the ground level.

1102.4 Intermediate Landing

Long flights of stairs shall be broken with intermediate landings not less than 3'6" wide, with each run at 90 or 180 degrees to the next higher or lower run. Stair runs of more than 15 risers are not permitted.

1102.5 Protective Screen

The outside stringers shall be protected by heavy galvanized wire-mesh screen or other approved protective railings not less than five feet high.

1102.6 Wire Glass in Adjacent Windows

Windows or doors located beneath or within 10'0" of fire escapes shall be glazed with wire glass.

1102.7 Handrails

Handrails shall be provided for each side of the stairs.

1102.8 Exit Door to Fire Escape

Exit doors leading to fire escapes shall be not less than 2'6" wide and equipped with bar-type panic hardware.

1102.9 Gate at Foot of Escape

Gates shall not be permitted at the foot of any fire escape unless equipped with panic hardware.

1102.10 Spiral and Tubular Fire Escapes

Slide type fire escapes hereafter installed to provide additional means of egress from heretofore erected buildings shall be of approved type and conform to the following:

1102.10a They shall not be used to provide means of egress from buildings exceeding 40'0" or three stories in height. The pitch and design shall be such that a person using the chute will be discharged without injury. Doors at the entrance to the chute shall have approved panic bar releases and shall swing with the exit travel and be so installed that they will not obstruct the use of the chute. If doors are installed at the lower end of the chute, they shall be equipped with a releasing device on the inside such as a kick plate.

1102.10b All sheet metal used for the chute shall be non-corrosive, shall not be painted on the inside and shall be maintained so as to be free from rust. Any part of the chute with which the user may come in contact shall be free from cracks, crevices, or any projection or roughness which may cause injury or reduce the effectiveness of the chute.

1102.10c All chutes shall be of sufficient size and ample strength and be supported in a substantial manner.

1102.11 Fire Escapes on New Buildings

New school buildings shall be so designed as to obviate the need for fire escapes.

1103 FIRE ALARMS AND AUTOMATIC FIRE DETECTION

1103.1 Installation Required

The installation of approved automatic fire detection equipment shall be required in all public school buildings except that the following type of school buildings shall not be required to be so equipped.

1103.2 Buildings Excepted

1103.2a One-story buildings with a direct exit to the outside from each classroom, library, and other instructional rooms and places of assembly (including cafeteria, auditorium, gymnasium, and multi-purpose room). No exterior exit door shall open onto a completely enclosed court or other inaccessible space.

1103.2b One-story school buildings of non-combustible construction including roofs, having a direct exterior exit door or an operable window sash not less than 2'6" wide and 3'0" high in each instructional room and direct exterior exit doors sufficient to provide exit units for not less than one-half the capacity of places of assembly (including library, cafeteria, auditorium, gymnasiums, and multi-purpose room). When an operable sash is provided, the sill shall be not more than 3'0" above the finished floor. No exterior exit door or emergency window shall open onto a completely enclosed court, roof, or other inacessible space.

1103.3 Type of Equipment Required

Every existing and new school building and every addition to a school building shall be equipped with an Underwriters' approved electrical, closed circuit, supervised fire alarm system of which an Underwriters' approved automatic fire detection system shall be an integral part, except as exempted above.

1103.4 Type of Detectors Approved

The automatic fire detection system shall detect an abnormal rate of rise of air temperature by means of the pneumatic principle, thermopile principle, or electric thermostat principle of the fixed-temperature or combination fixed-temperature and rate-of-rise type; or it may be designed to detect abnormal visible smoke densities or gaseous products of combustion; or it may be the automatic sprinkler type equipped with waterflow alarm devices.

1103.5 Connection to Existing Fire Alarm System

The new fire-alarm and automatic fire-detection system in building additions shall be conected to the system in the existing building so that all stations and detectors throughout the entire school plant will actuate all alarm bells or horns.

1103.6 Codes Covering Installation

The automatic fire detection and fire alarm system shall be installed in accordance with the National Fire Protection Association Standards Nos. 72-A, 72-B, 72-C, and 72-D as amended and in accordance with the recommendations of the equipment manufacturer. All wiring shall be installed and securely fastened in accordance with the National Electrical Code NFPA No. 70.

1103.7 Location of Detectors

Fire-detecting equipment shall be located on the ceiling or on the side walls near the ceiling and shall be installed throughout all parts of the protected premises including all rooms, corridors, storage areas, basements, attics, lofts and other accessible spaces; and inside closets, elevator shafts, dumbwaiter shafts, enclosed stairways, chutes, and other minor enclosures.

1103.8 Exemption When Building Is Sprinkled

Fire detectors shall not be required in buildings or those portions of a building protected by an approved automatic sprinkler system equipped with

waterflow alarm devices connected to sound all the audible fire alarm devices in the building.

1103.9 Exterior Alarms

An exterior fire bell and flashing or revolving light shall be provided to alert outsiders in the event the building is not occupied, except that school buildings directly connected to a municipal or approved central alarm office or fire house shall be exempt.

1103.10 Normal and Emergency Power Supply

The alarm system and control unit shall be of a closed circuit supervisory type operating on alternating or direct current. An emergency source of energy shall be provided. This may be by use of a generator or dry or wet batteries to operate a trouble bell or light indicating failure of the primary external source of power.

Every School district is urged to provide an emergency source of energy of sufficient size and type to maintain the automatic fire detection and manual alarm system for not less than twenty-four hours. Batteries when used shall have a minimum shelf life-span of not less than one year.

When an emergency source of power is provided, the system shall be so designed that automatic switching of emergency power is provided in case of main power failure. The change shall be accomplished without interruption of service and shall not cause a fire-alarm signal but shall cause both visual and audible trouble signals to respond. Automatic return to normal shall be provided when the primary supply is restored. In addition to the trouble alarm signals, separate and distinct audible and visual fire alarm signals shall be provided. A silencing switch shall be provided for the audible trouble signals and so arranged that a trouble light will be energized at all times when the switch is in off-normal position.

1103.11 Manual Reset

All fire-alarm signals shall be automatically locked in at the control panel until manually reset. The manual reset switch shall be of the self-restoring type which cannot be left in an abnormal position and shall be enclosed within the control cabinet or located so as not to be readily accessible to unauthorized personnel.

1103.12 Location of Manual Alarm Stations

Manual fire alarm stations shall be located at each exterior door from kitchen, heater room, places of assembly, in main office, near exterior exit doors serving two or more classrooms and near each exit in corridors, so that it shall not be necessary to travel more than 120 feet from the door of any room used by pupils to reach a station on the same floor.

1103.13 Sound of Fire Alarm Signal to Be Distinct

Fire-alarm signals shall have auditory sound distinct from all other signals within the building, shall not be used for any other purpose, and shall be so located that persons in all areas of the building, including high noise areas such as music rooms, kindergarten, shops, gymnasiums and locker rooms, shall be able to hear the signal.

1103.14 Connection to Municipal Fire or Police Department

It is recommended that the internal fire alarm and detection system be directly connected to the municipal or central alarm office so that the fire department will be automatically notified.

1103.15 Sprinkler System Required for Windowless Rooms

Where a school building has windowless rooms occupied by ten or more pupils without a second means of exit, the building or the area involved shall be provided with an underwriters' approved sprinkler system. Provided further that the area involved shall be closed off by automatic self-closing doors activated by smoke detectors in the event of fire.

1104 FIRE EXTINGUISHERS

1104.1 Type and Location

Fire extinguishers shall be of a type listed by the Underwriters' Laboratories, Inc. A 2½ gallon water type, class "A" type, or a ten-pound all-purpose dry chemical extinguisher shall be provided in all corridors. The location of fire extinguishers shall be indicated on the plans and such equipment shall be a part of the basic contracts.

1104.2 Type of Cabinet and Distribution of Extinguishers

Extinguishers in corridors shall be housed in a special cabinet or recess wall rack clearly identified and readily accessible at all times. When the cabinet is glazed, only wire plate glass shall be used. They shall be so distributed that one 2½ gallon water type extinguisher or equivalent shall be not more than 100 feet travel distance from any point, and so that there will be not less than one for each 5,000 square feet of floor area or fraction thereof. In trade schools and shops, the travel distance shall not exceed 50 feet and the number be not less than one for every 2,500 square feet of floor area or fraction thereof.

1104.3 For Grease, Oil, and Electrical Fires

For locations where fire may occur in flammable liquids, gases, grease, or electrical equipment, including, but not restricted to, shops, science laboratories stages, faculty rooms with cooking facilities, home-making rooms, kitchens and garages, at least one five-pound dry chemical type, or approved class "B" type, shall be provided in **addition** to those required in 1104.2 above. At least one 15 pound CO_2 or class "B" underwriters listed dry chemical type extinguisher shall be provided for heater rooms. A fire blanket shall be provided in home economics rooms.

1105
DUCTS, FLUES AND PLENUMS

1105.1 Construction

All ducts, flues and plenums used as air ducts shall be constructed of noncombustible material. (See also 1101.14 above.)

1105.2 Attic Space May Not Be Used

Exhaust ducts shall not empty into the attic space, but shall be direct connected to the exterior with noncombustible materials.

1105.3 Corridors and Stair Halls May Not be Used

No exhaust shall empty into stair halls or corridors.

1106
ELEVATORS

Elevators and dumbwaiters shall be designed in accordance with the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators, ASA-A17.1.

1107
STRUCTURAL SAFETY

1107.1 Codes and Standards

The following structural design standards in their most recently published or amended form shall be a part of this paragraph:

1107.1a "Building Code Requirements for Reinforced Concrete," (ACI 318-47). Approved as American Standard by the American Standards Institute.

1107.1b "Specifications for the Design, Fabrication and Erection of Structural Steel for Building." American Institute of Steel Construction.

1107.1c "Standard Specifications for Open Web Steel Joists J-Series and H-Series." "Standard Specifications for Open Web Steel Joists High Strength Longspan or LH-Series." American Institute of Steel Construction.

1107.1d "American Standard Building Code Requirements for Masonry". Issued March 15, 1944 by the U.S. American Standards Institute.

1107.1e "National Design Specification for Stress-Grade Lumber and Its Fastenings." Recommended by the National Lumber Manufacturers Association, Washington, D.C.

1107.2 Design Loads

School buildings and their accompanying structure shall be designed for all conditions of loading, as specified in the American Standard Buildings Requirements A58.1-1945, "Minimum Design Loads in Buildings and Other Structures," approved June 19,1945 by the U.S. American Standards Institute, and sponsored by the National Bureau of Standards, except as hereinafter specifically modified or as modified by future revisions.

1107.3 Live Loads

The live load assumed for purposes of design shall be the greatest loads that probably will be produced by the intended occupancies or uses. The assumed live loads, considered as uniformly distributed, shall be not less than the values given in the following table:

TABLE IV

Live Load Design

Occupancy or Use	Live Load Lbs. Per Sq. Ft.
Auditoriums and assembly halls with fixed seats on sloping or stepped floor	60
Movable or fixed seats on level floor	100
Stage floor	100
Balconies	
Fixed seats	60
Movable seats	100
Classrooms and laboratories	60
Libraries, larger than normal classroom (weight of book stacks shall be computed at no less than 20 lbs. per cubic foot)	80
Stairs, landings, and fire escapes	100
Shops	
For light operations	125
For agriculture, machinery, automobile repair	150
Store rooms	100
Toilet rooms	60
Corridors	100
Cafeterias	100
Kitchens	100
Fan rooms	150
Floor over boiler room	80
Gymnasiums	100
Grandstands, bleachers, etc.	100

1107.4 Bleachers

All bleachers and grandstands shall conform to the latest published requirements of the National Fire Protection Association Standard 102 for bleacher construction.

1107.5 Roof Loads

There shall not be placed, or caused or permitted to be placed, on any floor or roof of a building or other structure, a load greater than that for which such floor or roof is designed.

Roofs shall be designed for a uniformly distributed load, (including snow loads) on the horizontal projection as described in the following schedule of loads. The load shall be in addition to the dead load and wind load.

TABLE V
ROOF LOADS

Roof Slope	Uniform Load over Horizontal Projection Pounds per Square Foot
Less than 20°	30
20° or more	20

1107.6 Roofs Used as Promenades

Roofs to be used for promenades shall be designed for minimum load of 60 pounds per square foot in addition to the dead loads. Roofs to be used for other special purposes shall be designed for appropriate loads.

1107.7 Earthquake Loads

Earthquake loads shall not be required by this **Guide.**

1108
SCHOOL BUILDINGS OF THREE OR MORE STORIES

1108.1 Fire Resistive Construction

Buildings of three or more stories shall comply with the requirements for fire resistive construction as defined under 1101.3 above.

1108.2 Buildings of Three Stories

Buildings of three stories shall, in addition, comply with the following regulations:

1108.2a Floors, walls and ceilings of corridors, stairways, and heater rooms shall have a one-hour rating.

1108.2b Buildings completely equipped with an approved automatic sprinkler protection may be of noncombustible construction.

1108.2c Roofs, except over stage equipped to fly scenery and boiler rooms, may be of noncombustible construction.

1108.3 Buildings of More Than Three Stories

Buildings of more than three stories shall, in addition to the requirements of 1101.3 above, comply with the following regulations:

1108.3a The buildings shall be of noncombustible materials with a fire resistance rating of not less than two-hour construction including beams, girders, trusses, columns, piers, floor, walls, partitions, and all other structural members.

1108.3b The buildings, when completely equipped with an approved (N.F.P.A. No. 13) automatic sprinkler system, may be constructed of noncombustible materials with a fire-resistance rating of not less than one hour.

1108.3c All room doors shall be not less than 1 ¾" thick solid bonded core wood doors.

1108.3d Any interior corridor more than 300 feet in length shall be divided into sections not to exceed 300 feet in length by smoke barriers, consisting of partitions with smokestop doors therein. Such partitions shall be continuous through any concealed space, such as between the hung ceiling and the floor or roof above. Doors in smoke barriers shall be metal, metal covered or solid wood equivalent to a ¾ hour fire-resistance rating. A clear wire listed glass panel, ¼ inch thick, with an exposed area not exceeding 1296 square inches with no dimension exceeding 54 inches, shall be provided.

1108.3e Interior finish shall be class "A" with a flame spread of 25 or less in corridors, stairways, and other means of egress and may be class "B" or "C" in buildings completely equipped with an approved sprinkler system.

1108.3f Every portion of a building below the first floor shall be protected with a complete approved automatic sprinkler system.

1108.3g An area used for general storage, boiler or furnace room, fuel storage, janitor's closets, maintenance shops, woodworking shops, automotive shops, print shops, metal shops, painting areas, laundries, and kitchens shall be separated from the other parts of the buildings with self-closing "B" fire doors, or such areas shall be provided with approved automatic sprinkler protection.

1108.3h Elevators shall not constitute required means of exit. In any building where all the elevators have automatic operation, at least one elevator shall be arranged for use by firemen in accordance with NFPA No. 101

1108.3i Every air conditioning heating and ventilating installation shall comply with Chapter 7 of N.F.P.A. Code No. 101 as revised.

1108.3j In any auditorium, assembly room, cafeteria, gymnasium, or space with a capacity of 100 or more, with exit leading through corridors or stairways also serving as exits for other parts of the building, the exit capacity shall be sufficient to permit

simultaneous exit from the assembly and classroom section.

1108.3k Except for buildings with an approved complete sprinkler protection, every room or space used for classrooms or other educational purposes, or normally subject to student occupancy, unless it has a door leading directly to the outside of the buildings, shall have at least one outside window or egress which can readily be used for emergency rescue or ventilation purposes, and which meets all of the following provisions:

- Is readily operable from the inside without the use of tools.
- Provides a clear opening with a minimum dimension of 2'6" wide by 3'0" high.
- The bottom of the window or opening is not more than 36 inches above the floor.
- Where storm windows, screens, protective wire or burglar guards are used, they shall be provided with quick opening devices so that they may be readily opened from the inside for emergency egress, and then shall be so arranged that, when opened, they will not drop to the ground or reduce the required minimum window opening.

1108.3L All exit stairways shall extend upward to a fire door opening onto the roof. This door shall be equipped with panic hardware.

1108.3m Every exterior and interior wall and partition shall be fire-stopped at each floor level, at the top story ceiling level, and at the level of supports for roofs.

1108.3n Every unoccupied attic space or any concealed space between the ceiling and the roof shall be sub-divided by firestops into areas not to exceed 3,000 square feet.

1108.3o No chute or incinerator flue shall open directly on any exit or corridor to an exit, but shall be in separate room or closet separated from the exit or corridor by an approved self-closing "B" label fire door. Automatic sprinkler protection may be provided in lieu of the self-closing fire door.

1108.3p Approved standpipes shall be provided for fire fighting purposes in accordance with National Fire Protection Association Standards.

1109
EQUIPMENT SAFETY

1109.1 Electric Wiring, Grounding and Safety Switches

In industrial arts and vocational shops, every portable and stationary electrically operated device or motor, grinder, glue pot, and portable hand and stand lamp shall have its framework effectively grounded, and all portable electrical tools and machinery shall be equipped with electrical plugs and receptacles to ground the electrical connections in conformity with the regulations of the New Jersey State Department of Labor. At least two emergency cut-out switches shall be provided one at or near each end of the shop. Each individual piece of motorized electrical equipment, except portable hand tools, shall be controlled by a magnetic-type switch or other similar arrangements, whereby each piece of equipment must be manually reactivated after current interruption.

1109.2 Protection from Machinery

The protection from machinery and equipment in industrial shops shall be in accordance with the requirements of the New Jersey State Department of Education. (18A: 40-12.1 and 18A: 40-12.2)

1109.3 Emergency Fuel Cut Off Switch

An emergency cut-off switch for all fuel-firing systems shall be provided, conveniently located and clearly distinguishable.

1109.4 Venting Gas Heaters

All gas heaters shall be vented to the exterior of the building.

1109.5 Window Guards

Window guards, when used, shall be of open-wire mesh arranged so that they may be opened from the inside.

1110
GAS INSTALLATION

1110.1 Check Valves in Supply Lines

A check valve shall be installed in the line supplying gas to each classroom, laboratory, shop, or other area where gas is used by students, except home economic rooms.

1110.2 Gas Shut Off Valve

The shut-off valve at the gas meter shall be equipped with a handle or lever to permit easy operation of the valve. The OFF and ON position shall be plainly marked.

1110.3 Gas Meter and Shut Off Valve Location

The gas meter and the shut-off valve shall be located so as to be conveniently accessible to building operation personnel. The valve shall be identified by an appropriate sign or tag.

The gas shut-off valve shall be located so that it can be reached by a person outside the building via window, knock-out panel, door, or other device to permit shutting off the gas should access from the inside of the building become impossible due to fire or other hazardous conditions. Location of gas shut-off valve shall be clearly indicated on exterior of buildings.

1110.4 Gas Shut Off Valve at Street

There shall be a shut-off valve at the street for the use of the utility company when it is desirable to shut off the gas in the school building.

1110.5 Installation of Gas Piping

All gas piping installations within public school buildings shall be in accordance with the National Fire Protection Association Standard No. 54 as amended.

1110.6 Utility Lines Sleeved in Conduit

All utility lines, including water, electricity, sewer, oil, air, or other lines, at each point of entry into a school building, if below grade, shall be sleeved in a conduit and securely sealed with proper calking to prevent the seepage into the building of gas or other fumes.

1110.7 Gas Lines Encased in Conduit

Gas supply lines at each point of entry, exit, or re-entry into a school building shall be encased in a conduit, which conduit shall extend into a normally usable and accessible portion of the building and, at the point where the conduit terminates in the building, the space between the conduit and the gas piping shall be sealed to prevent the possible entrance of any leakage. The conduit shall extend at least four inches outside the building and be vented above grade. Vent pipes shall terminate outside the building at a point not less than two feet measured vertically or horizontally from any window or other building opening. The outer end of vent pipes shall terminate in a weather-proof and tamper-proof vent cap. They shall terminate sufficiently above the ground to avoid being obstructed with snow and shall be secured firmly to the building. The entire installation shall be such that the gas piping can be readily replaced without damage to the building. Vents in courts shall be extended to not less than five feet above the roof.

NOTE: Gas-fired unit ventilators in classrooms are not approved at this time.

1111
FALLOUT PROTECTION

Boards of Education, Superintendents of Schools, and school architects may incorporate in their building design improved fallout protection, using the "slanting technique" outlined by the U.S. Office of Civil Defense in Technical Manual 64-2, February 1965, or latest revision, which may be had from the Director of School Planning Services, Department of Education, Trenton, or the Director of Civil Defense, Department of Defense, Trenton, N.J. 08625 During the initial planning stages considerable improvement in the fallout protection factor can be achieved with little additional expense and without adversely affecting the educational operation of the school merely by the proper use of these techniques.

1112
PLASTIC DIFFUSERS AND CEILING PANELS IN BUILDINGS OF MORE THAN THREE STORIES

1112.1 Smoke Density Rating

The smoke density rating of plastic material shall be 0 to 50 as determined by evaluating a sample 1" x 1" x ¼" in accordance with the smoke chamber method for smoke determination outlined by the January, 1964, NFPA Quarterly.

1112.2 Heat Distortion

The heat distortion temperature of a plastic material shall be determined by ASTM-D 648-56.

1112.3 Ignition Temperature

The ignition temperature of a plastic material shall be as determined by ASTM-d-1929-62T.

1112.4 Where Permitted

An approved plastic material may be used in instructional areas and shall be permitted in places of assembly such as auditoriums, gymnasiums, and cafeterias, provided the aggregate area of the material does not exceed 30% of the area or ceiling to which the material or fixture is installed.

1112.5 Where Prohibited

Plastic diffusers shall not be installed in hazardous locations such as boiler rooms, incinerator rooms, garages, or electrical distribution rooms.

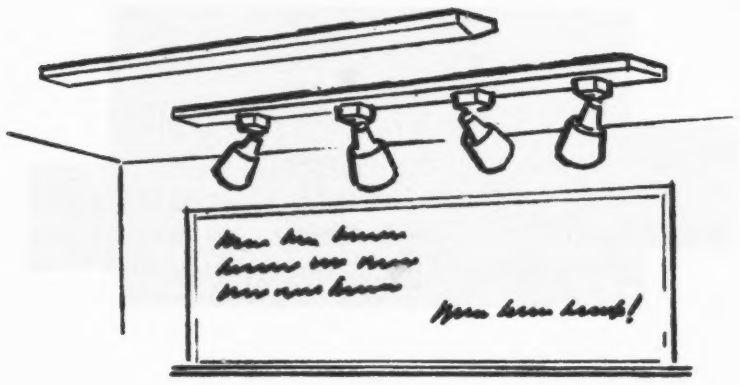
1112.6 Support Required

A plastic material shall be mounted or supported in such manner that it will not become readily detached when exposed, as installed, to an ambient temperature of 175 degrees for a period of fifteen minutes.

1112.7 Permissible Dimensions

The dimension of any single plastic diffuser or other application shall not exceed ten feet of the material if the plastic material is less than .05 inches in thickness. The area of a single diffuser or panel of such thinner material shall not exceed 30 square feet.

1200 LIGHTING



1201
PURPOSE

The intention of this section is to establish requirements for lighting levels, visual comfort conditions and safety considerations in such spaces.

1202
REFERENCES

1202.1 American Standard Guide for School Lighting.

1202.2 illuminating Engineering Society Lighting Handbook

1202.3 National Electrical Code.

In each of the above references, the latest published edition takes precedence.

1203
SUBMISSIONS

Drawings submitted by the Architect-Engineer shall state the footcandle levels to be maintained in each space at work level. It is recommended, but not mandated, that the luminaires specified and to be installed comply with the scissors-curve criteria including luminaire brightness ratios, using values of photometric data prepared by either E.T.L., I.T.L. or other approved testing laboratory for each luminaire to be used in a laboratory, as approved by the Architect-Engineer.

1204
UNIFORMITY OF ILLUMINATION

The uniformity of light intensity in instructional rooms shall be such that, within the work area, the minimum intensity at work level will not be less than 70 percent of the maximum light intensity.

1205
LUMINAIRE TYPES

No limitations shall be placed on luminaire types providing they comply with the requirements of this section.

1206
INSTALLED LIGHTING INTENSITY

TABLE VI
INSTALLED LIGHTING INTENSITY

Locations	Minimum * Footcandles
Classrooms and Instructional Areas — on work surface	50
Study Halls, Lecture Rooms, Art Rooms, Offices, Libraries, Conference Rooms, Work Rooms, Shops, Laboratories, and Secondary School Cafeterias.	50
Drafting, Typing and Sewing Rooms	70
Reception Rooms, Gymnasiums, Auditoriums, Cafeterias, All-Purpose Rooms, and Swimming Pools	30
Locker Rooms, Wash Rooms, Toilet Rooms, Corridors containing Lockers, Stairways	10
Corridors without lockers, and Store Rooms	5
Classrooms for the Partially Seeing	70

*Minimum footcandles maintained on the task at any time.

1207
RECOMMENDED REFLECTANCE FACTORS

TABLE VII
RECOMMENDED REFLECTANCE FACTORS

Surface	Reflection Factor
Ceilings, White	70 - 90%
Walls	40 - 60%
Furniture, Light-Colored	35 - 50%
Floors, Light-Colored	15 - 50%

1208
ARCHITECT ENGINEER DESIGN CONSIDERATIONS

Architects and engineers are urged to exercise ingenuity and originality within the framework of the above requirements. Nothing in the above lighting intensity requirements shall be considered maximum, and higher levels of illumination may be used where properly designed. Each individual environmental space should be carefully considered during the design stages and treated in the best manner possible consistent with economic responsibility.

1209
EMERGENCY LIGHTING

1209.1 Where Required

Emergency lighting shall be provided in new school buildings, alterations and additions for stairways, corridors, locker rooms, exits from auditoriums, gymnasiums, cafeterias, and other places of assembly with a capacity of 100 or more.

1209.2 Windowless Areas

Emergency lighting shall be provided for any stairway or corridor or windowless instructional area which is not provided with natural illumination.

1209.3 Energy Source

The emergency source of energy for illumination shall be a battery-type device, a generator-type device, or an independent generating station entirely separate from that which provides the regular source.

1209.4 Time limit

All emergency lighting systems shall provide full illumination automatically and within 10 seconds after normal source power failure.

1209.5 Power Rating

The power supply source shall have a suitable rating and capacity to supply and maintain, at not less than 91% of system voltage, the total load of the circuits or lamps supplying emergency light and emergency power for a period of not less than ½ hour.

1209.6 Type of Equipment

Individual unit equipment for emergency illumination shall consist of a battery, voltmeter, battery charger, one or more lamps, and a relaying device arranged to energize the lamps automatically upon failure of the normal supply to the building.

1209.7 Installation

Unit equipment shall be permanently fixed in place, and shall have all wiring to each unit installed in accordance with the requirements of the National Electrical Code NFPA No. 70.

1209.8 Duration and Intensity

Emergency lighting systems, other than unit systems utilizing flood or spot-light type distribution, shall produce and maintain for a period of ½ hour a minimum intensity of five-tenths (.5) of a footcandle, measured on a horizontal plane 30" above the floor.

1209.9 Spacing of Lights

Where unit storage battery systems utilizing flood or spot-light type of distribution are used, the throw of each beam shall not exceed fifty (50) feet. The projectors shall be directed towards the exits and located so as to provide distribution of light over the entire floor area.

1209.10 Type of Battery

Batteries utilized for emergency lighting shall be of the nickel-cadmium storage type, or approved equivalent (not lead acid storage).

1210
GENERAL SCHOOL LIGHTING REQUIREMENTS

1210.1 Three Way Switching

Corridor and stair hall lights shall be controlled by 3-way switches or other devices accomplishing the same purpose located at convenient control points.

1210.2 Exit lights Where Required

Exit lights shall be provided over exits from corridors, rooms of assembly, gymnasiums, and cafeterias, or other spaces with capacity of 100 persons or more.

1210.3 Codes

All electrical installations and equipment shall be in accordance with the National Electrical Code as amended (NFPA No. 70) or the Standard Building Code of New Jersey, Parts C., D. and F. Electrical, as amended.

1211
ELECTRICAL REQUIREMENTS IN PUBLIC EDUCATION BUILDINGS

1211.1 Classroom Outlets

Classrooms shall be provided with at least two duplex outlets.

1211.2 Assembly Room Outlets

Assembly rooms and Auditoriums shall be provided with a convenience outlet at the probable location of a portable projector. A built-in speaker cable shall be run from that location to a stage outlet.

1212
RECOMMENDATIONS INTERCOMMUNICATION SYSTEMS

1212.1 Intercommunication System

All high schools and most large elementary schools should be equipped with an intercommunication system which has adequate flexibility to enable its use as a teaching device. This system should be designed to provide broadcast listening on both the AM and FM frequencies, pickup and broadcasting of special school programs or events, including the ability to record and play back at a later time. The location of the central control panel is especially important. To assure privacy many school administrators prefer to have a separate telephone system. Microphone outlets should be provided at such locations as the gymnasium, auditorium, lunchroom, bus-loading platform, athletic field, and playground.

1212.2 Educational Television and Radio

The use of television as an education tool has increased gradually in recent years and will probably

increase more rapidly in the years to come. Consideration should therefore be given to the provision of a central television antenna with service outlets extending to each instructional room. Consideration should also be given to the possible installation of an AM and FM radio antenna with service outlets in each classroom.

1213
DAYLIGHTING

1213.1 Window Area

Where instructional areas are provided with windows, the window area shall be optional, provided that the aggregate length of the masonry opening shall be not less than 10 feet. The windows shall be glazed with clear glass or other transparent medium, having a light transmission factor of not less than 10 percent.

1213.2 Window Height

The height of the window area shall be not less than 5'6" above the finished floor extending downward to the window stool.

1213.3 Window Stools

Window stools in regular instructional areas shall not be more than 36 inches above the finished floor except in shops, home economic rooms, laboratories, art rooms, mechanical drawing rooms, music rooms, and libraries where the height of the stool shall be optional.

1213.4 Operable Sash

At least one-half of the window area shall consist of operable sash permitting ventilation. Double hung windows will be computed at one-half the total area.

1213.5 Window Glazing

Plastic and glass fiber reinforced panels of the slow-burning type shall be permitted for glazing exterior windows provided all other requirements outlined above are satisfied.

1213.6 Secondary Exit Opening

When the window stool is more than 4'0" above the finished floor, a direct exit to the outside or a secondary means of egress as defined in section 605.6 or an emergency exit window as defined in section 1103.2b shall be provided.

1300 MISCELLANEOUS

1301
LOCKERS AND WARDROBES

Provision shall be made for the storage of pupils' clothing. Where the clothing of pupils is to be stored in closed wardrobes, provision shall be made for the positive ventilation of such space.

1302
FLOOR COVERING

1302.1 Resilient Floors

Concrete floors without resilient floor covering shall not be permitted in instructional areas, except in shops.

1302.2 Carpeting

A heavy fabric may be used as a floor covering provided it is of the slow burning type. Carpeting when used in corridors, exit passages, stairways and places of assembly shall have a class "B" flame spread of 75 or less.

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